BIOLOGY

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CONTENTS

OBJECTIVES (MCQ'S) OF CHAPTER-15 (HOMEOSTASIS) BOARD PAPERS-2011-21

Concepts in Homeostasis

1. **The protection of internal environment form the harms of the fluctuations in external environment are termed as:**
(A) Osmoregulation (B) Thermoregulation (C) Excretion (D) Homeostasis

Osmoregulation

2. **Extracellular environment may be of diluted solution compared to the cell concentration thus designated as:** **(2 times)**
(a)Isotonic (b) Hypertonic (c) Hypotonic (d) Cotonic
3. **The more concentrated external environment is termed as:**
(a)Hypotonic (b) Hypertonic (c) Isotonic (d) Peritonic

Osmoregulation in plants

4. **Those plants which have moderate water availability are called:**
(a)Hydrophytes (b) Mesophytes (c) Xerophytes (d) Saprophytes
5. **Mango belongs to:**
(a)Hydrophytes (b) Mesophytes (c) Xerophytes (d) Hygrophytes
6. **The mesophyte plant is:**
(a)Cacti (b) *Hydrilla* (c) Brassica (d) Kikar
7. **Hydrophytes posses:** **(2-times)**
(a)Small leaves (b) large leaves
(c) Less water (d) Stomata on lower surface of leaves
8. **The stomata are located on the upper surface only in:**
(a)Xerophytes (b) Hydrophytes (c) Mesophytes (d) Epiphytes
9. **The plants that have adaptation of small and thick leaves to reduce water loss are called:**
(A) Hydrophytes (B) Mesophytes (C) Xerophytes (D) Hygrophytes
10. **Which one is not a mesophyte?**
(A) Brassica (B) Rose (C) Mango (D) Cacti

Osmorgulation in animals

11. **How much water is needed to excrete 1 g of Ammonia?** **(2-times)**
(a) 400 ml (b) 500 ml (c) 600 ml (d)700 ml
12. **Fresh water protozoans pump out excess water by:**
(a)Food vacoule (b) Pinocytosis (c) Contractile vacuole (D) Exocytosis
13. **Anhydrobiosis refers to tolerate:**
(a)Dehydration (b) Hydration (c) Anhydration (d) Rehydration
14. **Animals that do not require adjusting their internal osmotic state actively are known as:**
(A) Osmoregulators (B) Osmoconformers (C) Terrestrial (D) Hypertonic
15 **Trirmethylamine Oxide is produced in:-**
(a) Hag fish (b) Bony fish (c) Marine fish (d) Cartilaginous fish
16. **The tolerance of dehydration is:-**
(a) Osmoconformers (b) Osmoregulators (c) Anhydrobiosis (d) Dehydration
17. **Contractile vacuoles are found in**
(a) Plants (b) Fresh water protozoa (c) Terrestrial animals (d) Marine plants

ختم نبوت ﷺ زندہ باد　　　　عظمت صحابہ زندہ باد

السلام علیکم ورحمۃ اللہ وبرکاتہ:

معزز ممبران: آپ کا وٹس ایپ گروپ ایڈمن "**اردو بکس**" آپ سے مخاطب ہے۔

آپ تمام ممبران سے گزارش ہے کہ:

- گروپ میں صرف PDF کتب پوسٹ کی جاتی ہیں لہذا کتب کے متعلق اپنے کمنٹس / ریویوز ضرور دیں۔ گروپ میں بغیر ایڈمن کی اجازت کے کسی بھی قسم کی (اسلامی وغیر اسلامی، اخلاقی، تحریری) پوسٹ کرنا سختی سے منع ہے۔
- گروپ میں معزز، پڑھے لکھے، سلجھے ہوئے ممبرز موجود ہیں اخلاقیات کی پابندی کریں اور گروپ رولز کو فالو کریں بصورت دیگر معزز ممبرز کی بہتری کی خاطر ریموو کر دیا جائے گا۔
- کوئی بھی ممبر کسی بھی ممبر کو انباکس میں میسج، مس کال، کال نہیں کرے گا۔ رپورٹ پر فوری ریموو کرکے کاروائی عمل میں لائے جائے گی۔
- ہمارے کسی بھی گروپ میں سیاسی و فرقہ واریت کی بحث کی قطعاً کوئی گنجائش نہیں ہے۔
- اگر کسی کو بھی گروپ کے متعلق کسی قسم کی شکایت یا تجویز کی صورت میں ایڈمن سے رابطہ کیجئے۔
- سب سے اہم بات:

گروپ میں کسی بھی قادیانی، مرزائی، احمدی، گستاخِ رسول، گستاخِ امہات المؤمنین، گستاخِ صحابہ و خلفائے راشدین حضرت ابو بکر صدیق، حضرت عمر فاروق، حضرت عثمان غنی، حضرت علی المرتضیٰ، حضرت حسنین کریمین رضوان اللہ تعالیٰ اجمعین، گستاخ اہلبیت یا ایسے غیر مسلم جو اسلام اور پاکستان کے خلاف پراپیگنڈا میں مصروف ہیں یا ان کے روحانی وذہنی سپورٹرز کے لئے کوئی گنجائش نہیں ہے لہذا ایسے اشخاص بالکل بھی گروپ جوائن کرنے کی زحمت نہ کریں۔ معلوم ہونے پر فوراً ریموو کر دیا جائے گا۔

- تمام کتب انٹرنیٹ سے تلاش / ڈاؤنلوڈ کر کے **فری آف کاسٹ** وٹس ایپ گروپ میں شیئر کی جاتی ہیں۔ جو کتاب نہیں ملتی اس کے لئے معذرت کر لی جاتی ہے۔ جس میں محنت بھی صَرف ہوتی ہے لیکن ہمیں آپ سے صرف دعاؤں کی درخواست ہے۔
- عمران سیریز کے شوقین کیلئے علیحدہ سے عمران سیریز گروپ موجود ہے۔
- **لیڈیز کے لئے الگ گروپ کی سہولت موجود ہے جس کے لئے ویریفیکیشن ضروری ہے۔**
- اردو کتب / عمران سیریز یا سٹڈی گروپ میں ایڈ ہونے کے لئے ایڈمن سے وٹس ایپ پر بذریعہ میسیج رابطہ کریں اور جواب کا انتظار فرمائیں۔ برائے مہربانی اخلاقیات کا خیال رکھتے ہوئے موبائل پر کال یا ایم ایس کرنے کی کوشش ہر گز نہ کریں۔ ورنہ گروپس سے تو ریموو کیا ہی جائے گا بلاک بھی کیا جائے گا۔

نوٹ: ہمارے کسی گروپ کی کوئی فیس نہیں ہے۔ سب فی سبیل اللہ ہے

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اللہ تبارک تعالیٰ ہم سب کا حامی وناصر ہو

Excretion in plants

18. Which one of the following is excretophore?
(a)Stem (b) Root (c) Bark (d) Leaves

19. Mechanism which eliminates nitrogenous waste is referred as:
(a)Osmoregulation (b) Excretion (c) Thermoregulation (d) Egestion

20. Ammonia is produced as excretory product by the animals inhabiting the medium (2-times)
(a)Isotonic (b) Hypotonic (c) Hypertonic (d) Xeric

21. Animals excreting ammonia are (2-times)
(a)Ureotelic (b) Uricotelic (c) Ammonotelic (d) Excretotelic

22. The excretory product that requires minimum water for its removal is: (2-times)
(a) Urea (b) Uric acid (c) Creatinine (d) Ammonia

23. Uric acid is produced from the metabolism of: (2-times)
(a)Amino acid (b) Nucleic acid (c) Fatty acid (d) Protein

24. Sharks excrete nitrogenous wastes in the form of:
(a)Ammonia (b) Uric acid (c) Urea (d) Allantoin

25. The most toxic nitrogenous waste is:
(a)Urea (b)Uric acid (c) Creatinine (d)Ammonia

26. Nitrogenous waste is very toxic and dissolve quickly in body fluids is:
(a)CO_2 (b) Urea (c)Ammonia (d)Uric acid

27. The most toxic nitrogenous waste in animals is:
(A) Uric acid (B) Ammonia (C) Urea (D) Creatine

Excretion in Planaria

28. The protonephridium is the excretory organ of:
(a) Amoeba (b) Hydra (c) Planaria (d)Earthworm

29. Flame cells are part of excretory system of: (4-times)
(a) Cockroach (b) Earthworm (c)Hydra (d) Planaria

30. Animals of the group of flat worms have simple tubular excretory system calle as:
(A) Kidney (B) Nephron (C) Nephridium (D) Protonephridium

Excretion in earthworm

31. Which one of the following structures is present in earthworm?
(a) Metanephridium (b)Protonephredium (c)Malphigian tubules (d) Nephron

32. Earthworm:
(a) Prenephridia (b) Protonephridia (c)Mesonephridia (d)Metanephridia

Excretion in cockroach

33. The structural and functional relationship between nutritive and excretoı system exists in:
(a) Planaria (b) Earth worm (c)Cnidarian (d)Insects

34. The uric acid is excreted out as solid excreta in:
(a) Star fish (b)Planaria (c)Earthworm (d)Cockroach

35. Excretory structures present in cockroach are (4-times)
(a) Contractile vacuole (b) Malpighian tubules (c)Nephredia (d) Flame cells

36. Cockroach excrete nitrogenous wastes in the form of
(A) Ammonia (B) Urea (C) Uric acid (D) Allantoin

Excretory organs (Liver)

37. In urea cycle, the detoxified form of ammonia is:
(a)Urea (b) Ammonium ions (c) Uric acid (d) Nitrates

38. **The major homeostatic function of liver is storage of (2-times)**
(a)Bile (b) Glycogen (c) Urea (d) Albumin

39. **The arginine is split by arginase to form urea and the precursor:**
(a) Ornithine (b) Citrulline (c) Alanine (d) Glycine

40. **Urea is produced in (3-tmes)**
(a)Lungs (b) Liver (c) Kidneys (d) Pancreas

41. **Arginase splits the arginine to form urea and (3-tmes)**
(a) Citrulline (b) Ornithine (c) Creatinine (d) Histidine

Urinary system

42. **Urine leaves kidney through a duct called:**
(a) Urethra (b) Ureter (c) Urinary bladder (d) Pelvis

43. **Blood supplied to kidney from each cardiac beat is:**
(a) 10% (b)20% (c)30% (d)50%

44. **Mammalian kidney including human is adapted to conserve water up to:**
(A) 69.5% (B) 79.5% (C) 89.5% (D) 99.5%

45. **All the collecting tubules of human kidney finally discharge into the:**
(A) Bowman's capsule (B) Glomerulus (C) Pelvis (D) Urethra

Nephron

46. **A pair of kidneys consists of millions of functional units known as (3-times)**
(a)Neurons (b) Nephrons (c) Dendrons (d) Flatrons

47. **In juxtamedullary nephrons additional capillaries extend down to form a loop of vessel called:**
(a)Peritubullar capillaries (b) Efferent arterioles (c)Vasa recta (d) Glomerulus

48. **Aldosterone helps in the active uptake of**
(A) Potassium (B) Sodium (C) Calcium (D) Phosphorus

49. **The reabsorption of water in collecting tubules is under the control of:**
(A) Aldosterone (B) ADH (C) Tubular secretion (D)Pressure filteration

Kidney problems

50. **High degree of renal failure is also called (4-times)**
(a)Uremia (b) Leucaemia (c) Anemia (d)Lithotripsy

51. **The incidence of calcium oxalate type stones are: (4-times)**
(a)75% (b)15% (c)10% (d)70%

52. **Increased plasma level of urea is an indication of:**
(a)Renal failure (b) Kidney stone (c) Hypocalcemia (d) Hyperoxaluria

53. **Abdomen has peritoneal cavity, lined by a thin epithelium called:**
(a)Peritonium (b) Pericardium (c)Sacrotal sac (d)Pleura

54. **The human abdominal cavity is lined by a thin epithelium called (2-times)**
(a)Ectoderm (b) Endoderm (c)Peritonium (d)Epidermis

55. **Non-surgical removal of kidney stones is called:**
(A) Dialysis (B) Lithotripsy (C) Uremia (D) Kidney transplant

56. **High level of circulating calcium in the blood is called:**
(A) Hypercalcemia (B) Hypoglycemia (C) Osteomalcia (D) Hyperoxaluria

Thermoregulation in plants

57. **Super cool cytosol, without ice formation, is caused by:**
(a)Heat shock protein (b) Unsaturated fatty acids (c) Solutes (d) Enzymes

Thermoregulation in animals:

58. **Which animal is not poikilotherm?**
(a)Star-fish (b) Frog (c) Tortoise (d) Parrot

59. Lizards bask in sun to gain:
(a)Heat (b) Cold (c) Air (d) Moisture

60. The animals that generate their own body heat through heat production as by product during metabolism are called (2-times)
(a)Endotherm (b)Ectotherm (c)Heterotherm (d)All of these

61. Most land mammals respond to cold by raising their:
(a) Tail (b) Head (c) Legs (d) Furs

62. Bats and humming Birds are called: (2-times)
(a)Ectoderm (b)Endotherm (c)Poikilotherm (d) Heterotherm

63. Which is an endotherm? (3-times)
(a)Bird (b) Bat (c) Humming bird (d) Reptiles

64. Which of the following is not endotherm? (2-times)
(A) Bird (B) Amphibian (C) Flying insects (D) Mammals

Thermostat function and feedback mechanism:

65. The homeostatic thermostat in man is:
(A) Thalamus (B) Cerebrum (C) Medulla (D) Hypothalamus

Pyrexia:

66. During infection, pyrogens are produced in the human body by (2-tmes)
(a) RBCs (b) WBCs (c) Platelets (d) Blood plasma

67. The chemical substance, responsible for raising human body temperature are:
(a)Leukocytes (b) Pyrogens (c) Pyrexia (d) Pollutants

68. In bacterial and viral Infection, pathogens and leukocytes cells produce a chemical called:
(A) Pyrexia (B) Toxins (C) Alfatoxins (D) Pyrogen

2018

69. Glomerular filtrate are reabsorbed in:
(a) Proximal tubule (b) Bowman's capsule (c) Loop of Henle (d) Distal tubule

70. Metanephridia are the excretory structure present in:
(a) Hydra (b) Planaria (c) Cockroach (d) Earthworms

71. In each nephron inner end form a cup shaped swelling called:
(a) Glomerulus (b) Henle's loop (c) Bowman's capsule (d) Pelvis

72. Animals excreting urea are called:
(a) Ureotelic (b) Ammonotelic (c) Uricotelic (d) Excretotelic

73. A dilute solution compared to cell concentration is termed as:
(a) Hypertonic (b) Hypotonic (c) Isotonic (d) Paratonic

74. Number of NH_3 molecules required to produce one molecule of urea is:
(a) 1 (b) 2 (c) 3 (d) 4

75. Sunkens stomata are found in which of the following group of plants?
(a) Hydrophytes (b) Xerophytes (c) Mesophytes (d) Bryophytes

76. The fever causing chemical substances in human are:
(a) Pathogens (b) Poisons (c) Pyrogens (d) Pyrexia

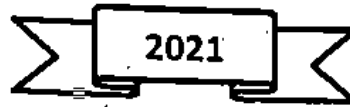
2019

77 The malpighian tubules remove nitrogenous wastes from the:
(A) Lymph (B) Haemolymph (C) Coelomic fluid (D) Hind gut

78. Detection of change and signalling for effector's response to control system is:
(A) Positive feed back (B) Negative feed back
(C) Feed back mechanism (D) Feed forward mechanism

79. The incidence of uric acid kidney stones is:
(A) 10% (B) 15% (C) 20% (D) 70%

80. Flame cells are the part of excretory system of:
(A) Hydra (B) Earthworm (C) Plannaria (D) Cockroach

2021

81- The plants which *have* the adaptations for reduced rate of transpiration.
(A) Hydrophytes (B) Mesophytes (C) Xerophytes (D) Bryophytes

82- The active absorption of Sodium in the ascending limb of Henle is promoted by:
(A) ADH (B) ATCH (C) Vesopression (D) Aldosterone

83- Which one of the following is an ectotherm:
(A) Bird (B) Huming bird (C) Amphibian (D) Bat

84- A plant adapted to remove the flooding of its cells in fresh water is
(A) Xerophyte (B) mesophyte (C) hydrophyte (D) geophyte

85- The nature of shivering thermogenesis adaptation is
(A) Structural (B) physiological (C) psychological (D) behavioral

86- Which emulsifies fats in small intestine?
(A) Bile (B) Glycogen (C) Cholesterol (D) Lipoprotein

87- The central station of metabolism and metabolic clearing house of the body is:
(A) Liver (B) Stomach (C) Hypothalamus (D) Pancreas

88- Urine leaves the body through:
(A) Pelvis (B) Ureter (C) Urinary bladder (D) Urethra

89- Removal of salts with water from sweat glands and of sebum seems to be:
(A) Excretory (B) Protective (C) Thermo-regulation (D) Both B & C

90- Nitrogen of amino acids is converted into urea by:
(A) Kidney (B) Liver (C) Spleen (D) Pancreas

91- Most invertebrates, fish, amphibians and reptiles arc included in:
(A) Ectotherm (B) Endotherm (C) Heterotherm (D) Homeotherm

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
D	C	B	B	B	C	B	B	C	D	B	C	A	B	C	C	B	D
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
B	B	C	B	B	A	D	C	B	C	D	D	A	D	D	D	B	C
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
A	B	A	B	B	B	B	D	C	B	C	B	B	A	D	A	A	C
55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
B	A	C	D	A	A	D	D	A	B	D	B	B	D	A	D	C	A
73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
B	B	B	C	B	C	A	C	C	D	C	C	B	A	A	D	D	B
91																	
A																	

SHORT QUESTION'S AND ANSWER'S OF CHAPTER-15 (HOMEOSTASIS) BOARD PAPERS-2011-21

Concepts in Homeostasis

1. Differentiate between osmoregulation and thermoregulation (4-times)

Ans:

Osmoregulation	Thermoregulation
The mechanism of regulation, generally between organism and its environment of solute and the gain & loss of water is called osmoregulation.	The maintenance of body temperature within a tolerable range is called thermoregulation.

2. Define Homeostasis.

Ans: The protection of internal environment from the harms of fluctuations in external environment is called homoeostasis. The homeostasis keeps the internal fluctuations in a narrow range with various control systems compared to wider external fluctuations. The control system would not let the body flooded with water in abundant supply of water.

Osmoregulation

3. Differentiate between hypotonic and hypertonic solution (3-times)

Ans:

Hypotonic solution	Hypertonic solution.
Diluted solution compared to the cell concentration is called hypotonic solution.	The more concentrated external environment as compared to cell is called hypertonic solution.

4. What is hypertonic environment and what changes occur in a cell in such environment?

Ans: The more concentrated external environment is called hypertonic environment. The hypertonic environment makes the cell solution concentrated and cell shrinks due to loss of water.

Osmoregulation in plants

5. Differentiate between hydrophytes and mesophytes.

Ans:

Hydrophytes	Mesophytes
Hydrophytes are the plants which grow in aquatic environment (abundant water), they have large leaf surface area and stomata are present on the upper side of leaves, they have high rate of transpiration. e.g., Water lilli, Wolfia, Pistia etc.	These are the plants which grow on land where moderate water is available; they open their stomata during flooding and close stomata during drought. For example: rose and mango.

6. What are Xerophytes? Give its examples. (2-times)

Ans: Plant which grow under drought or in extreme shortage of water these plants are called xerophytes. e.g., Cacti, *Opuntia*, *Calatropis*.

7. Write four osmoregulatory adaptations in xerophytes.

Ans: They have following adaptations:

i. sunken stomata
ii. Thick cuticle
iii. water storing tissues
iv. Reduced or complete absence of leaves.

8. Give four adaptations of xerophytes. (2-times)

Ans: Xerophytes have following adaptations

i. Reduced leaves ii. Hidden stomata ii. Thick cuticle iv. Water storing tissues

Osmorgulation in animals

9. Define anhydribiosis with an example. (5 times)

Ans: The ability to tolerate dehydration, this process is called anhydrobiosis. For example: Kangaroo Rat a desert animal can tolerate dehydration without drinking water by feeding desert plants containing more carbohydrates, which produce water of metabolism.

10. Differentiate between osmoconformers and osmoregulators (4-times)

Ans:

Osmoconformers	Osmomregulators:
Osmoconformers are those animals which keep their body fluid in isotonic form as compared to external environment for marine water environment. These animals do not require actively to adjust their internal osmotic state, so they are known as osmoconformers. e.g Hag fishes	**Osmomregulators:** In these animals body fluid concentration differs from outer environment and they require to actively regulates to discharge excess water in hypotonic and excrete salts in hypertonic condition. e.g Bony fishes

11. Give the role of contractile vacuole. (2-times)

Ans: Contractile vacuole play an important role in osmoregulation in aquatic animals, it absorbs extra water from the cell and excrete it out. For example in paramecium two contractile vacuoles are present, which perform osmoregulatory function.

Excretion in plants

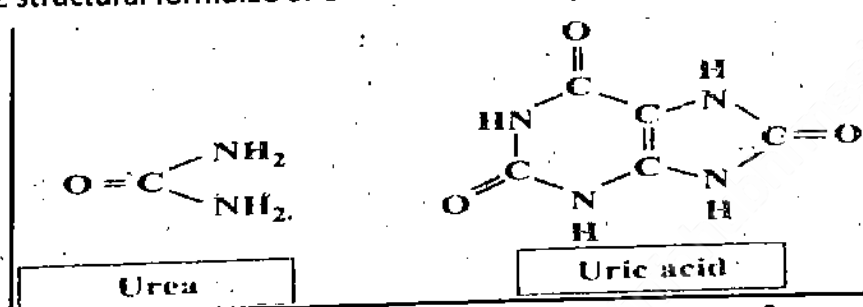
12. Define excretophore. / What are excretophores & why? (4-times)

Ans: Leaves are called excretophores because they collect nitrogenous waste from different plant parts and they store temporarily, at autumn season plants shed their leaves and wastes are removed from plant body.

13. Define Excretion.

Ans: Removal of waste products (especially nitrogenous wastes) from the body is called excretion.

Excretion in animals + Nature of excretory products in relation to habitats.

14. Give structural formulae of Urea and uric acid.(4-times)

15. Why ammonia is more toxic than other nitrogenous wastes?

Ans: Ammonia is very toxic and dissolves quickly in body fluids. Thus it must be kept in low concentration in the body. To maintain low concentration below that of body requires, large volume of water also to eliminate it in urine as it is produced.

16. Differentiate between ureotelic and uricotelic animals. (2-times)

Ans:

Ureotelic Animals	Uricotelic Animals.
Animals which excrete urea are called ureotelic e.g sharks.	Animals which excrete uric acid are called Uricotelic e.g Birds, insects.

17. What are different metabolic wastes in humans?

Ans: Following are the metabolic wastes

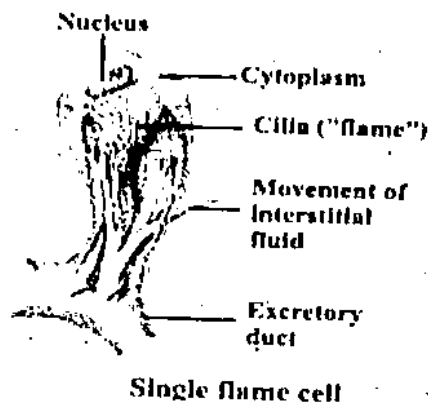
i. Urea ii. Salts iii. Phosphates
iv. Sulfates v. Excess substances

18. Name waste products produced during metabolism of purine and pyrimidine.

Ans: Waste products of purine and pyrimidine are hypoxanthine, xanthine, uric acid allantoin, urea and ammonia.

Excretion in planaria

19. Draw and label single flame cell of planaria (2-times)

Single flame cell

20. What is flame cell? Why it is called so?

Ans: Flame cell is the part of excretory system of Planaria. It is called flame cell because it has tuft of cilia, which looks like flickering flame of candle.

21. Describe the structure of a flame cell.

Ans: It is a complete eukaryotic cell. It has a nucleus, other cell organelles and a cavity where the waste products are collected.Each flame cell has a tuft of cilia, whose beating propel interstitial fluid into the tubular system

Excretion in earth worm

22. What is metanephredium?

Ans: It is the excretory organ of earthworm and other annelids. In each segment of the body metanephridium is present which individually collects the wastes and then remove them.

23. Give difference between protonephridium and metanephridum. OR Differentiate between protonephridia and metanephridia. (4 times)

Ans:

	Protonephridium	Metanephridium
1	It is blind at both ends	It is opened at one end and blind at other end.
2	Excretory structure present in flatworm and not repeated in segments	Excretory structure present in earth worm and repeated in each segment of the body.
3	It absorbs only waste products and there is no process of reabsorption.	It absorbs interstitial fluid and wastes are separated by the process of reabsorption.
4	It is primitive structure	It is advance structure.

Excretion in cockroach

24. Illustrate the function of malphighian tubules.

Ans: Malphigian tubules extracted waste products from the haemolymph of insects and they pour it into digestive tract, where they are converted into nitrogenous wastes.

Excretory organs (Liver)

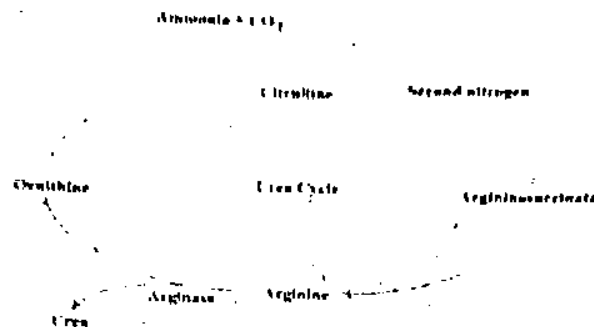
25. Write two types of synthesis functions of liver and effects on homeostasis.

Ans: Synthesis functions of liver include:

i. Synthesis of urea, ammonia and uric acid. It assists kidney for the removal of wastes.

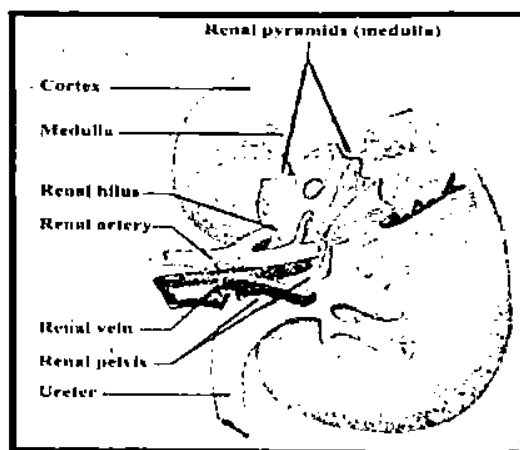
ii. Synthesis of plasma proteins like prothrombin and fibrinogen. It maintains osmotic balance of blood and help in blood clotting.

26. Briefly describe urea cycle and also draw it . OR Draw & label the urea cycle. **(4-times) (2018)**

Ans: **Urea cycle:** Two ammonia and one carbon dioxide molecule is added in the urea cycle. One ammonia molecule combines with carbon dioxide and ornithine to form citrulline, subsequently ammonia combines to form arginine. The arginine split by arginase to form urea and the precursor ornithine for next cycle.

27. What is function of bile?

Ans: Function of bile is to emulsify the large fat globules into small fat globules so that they can easily be digested.

Urinary system

Sketch the human kidney.

Nephron

28. What are effects of ADH and Aldosterone on work of nephron? (2-times)

Ans: The active uptake of sodium in the ascending limb or thick loop of Henle is promoted by the action of aldosterone. ADH actively transport water from filterate in collecting tubules back to kidney.

29. Compare cortical nephron with juxtamedullary nephron

Ans:

Cortical Nephron	Juxtamedullary nephron
The nephrons arranged along the cortex are called cortical nephrons.	Nephrons which are arranged along the border of cortex and medulla with their tubular system looping deep in inner medulla. These juxtamedullary nephrons are specifically involved in the production of concentrated urine.

30. Name two hormones involved in nephron function. **(2-times)**

Ans: Anti diuretic hormone and Aldosteron are involved in nephron function.

31. What is counter – current multiplier? **(4-times)(2018)**

Ans: This mechanism cause's gradual osmotic out flow from the filtrate back to kidneys as it passes downward in the descending loop of Henle. Furthermore, ascending loop of Henle does not allow out flow of water from its filtrate, instead actively transport sodium ions into kidney interstitium to sustain its high concentration.

32. Explain briefly glomerular filtrate.

Ans: It is the filtrate which is produced by the filtration of blood from the glomerulus, it contains glucose, amino acid, small blood cells, salts, nitrogenous wastes and water.

33. What are juxtamedullary nephrons? **(2-times)**

Ans: Nephrons arranged along the border of cortex so that their tubular system looping deep in inner medulla are called juxtamedullary nephrons. These juxtamedullary nephrons are specifically involved in the production of concentrated urine.

34. Differentiate between afferent and efferent arterioles.

Ans:

Afferent artery	Efferent artery
The branch of renal artery which brings blood to the glomerulus is called afferent artery.	The branch of renal artery which takes blood away from glumerulus is called efferent artery.

35. What is vasa recta?

Ans: In juxtamedullary nephrons additional capillaries extend down to form a loop of vessels called vasa reata

Kidney problems

36. What is renal failure?

Ans: Various factors of pathological and chemical nature may progressively destroy the nephron, particularly its glomerular part. This result in increase in the plasma level of urea and nitrogenous wastes. This rise in urea raises complications of increase in blood pressure and anemia etc.

37. What is hemodialysis and peritoneal dialysis? **(2-times)**

Ans: **Hemodialysis** means cleaning of blood. In it blood is circulated through a machine which contains a dialyzer. Dialyzer has two spaces separated by thin membrane. Blood passes through one side of membrane and dialysis fluid from other side. The waste and excess water pass from the blood through the membrane into the dialysing fluid.

Peritoneal dialysis work on same principle except that abdomen has a peritoneal cavity, lined by a thin epithelium called peritoneum. Peritonial cavity is filled with dialysis fluid that enters the body through a cathetar. Excess water and wastes pass through the peritoneum into the dialysing fluid.

38. What is lithotripsy? **(4-times) (2018)**

Ans: (Litho means stone, tripsy means breakdown) It is the technique used to break up stones that form in the kidney, ureter or gall bladder. It is used for non-surgical removal of kidney stones.

39. Write a short note on kidney transplantation.

Ans: Dialysis may be used as a temporary measure. ın high degree renal failure also called as uremia or end stage renal disease, the dialysis can not be done hence does the surgical transplantation of a matching bonal kidney is the only option left for as the permanent treatment.

40. Define dialysis. Give its types.

Ans: In chronic renal failure, the function of the kidney is completely lost and is unable to remove nitrogenous waste. To remove nitrogenous waste, particularly the urea, the blood of the patient is treated through dialysis. It cleans the blood either by passing it through and artificial kidney or by filtering it within the abdomen. It is of two types:

i) Peritoneal dialysis ii) Haemodialysis

41. What is hypercalcemia? Give its effects.

Ans: High level of circulating calcium in the blood is called hypercalcemia. Hypercalcemia may cause kidney stone.

Thermoregulation in plants

42. What are heat-shock proteins? / What are heat shock proteins at which temperature they work. **(5-times)**

Ans: Most plants have adapted to survive in heat stress as the plants of temperate regions face the stress of 40°C and above temperature. The cells of these plants synthesize large quantities of special proteins called heat shock proteins. These proteins embrace enzymes and other proteins thus help to prevent denaturation.

Thermoregulation in animals

43. Differentiate between poikilotherms and homeotherms. **(3-times)**

Ans:

Poikilotherms	Homeotherms
These are animals in which body temperature tends to fluctuate more or less with ambient temperature where air or water temperatures are changed, are called poikilotherms. For example: fish, amphibians, reptiles etc.	The animals exposed to changing air or water temperature maintain their body temperature is called homeotherms. For example: birds and mammals.

44. Differentiate between ectotherms and endotherms. **(4-times)**

Ans:

Ectotherms	Endotherms
Ectotherms: The animals which produce metabolic heat at low level and that is also exchanged quickly with the environment however absorb heat from their surroundings. For example most invertebrates, fish, amphibians and reptiles.	**Endotherms:** These animals produce their own body heat through heat production as by product during metabolism. For example: some fishes and flying insects.

45. How marine mammals regulate their body temperature? / What is blubber? **(2-times)**

Ans: Marine animals such as whales and seals inhabit much colder water than their body temperature, have a thick layer of insulating fat called blubber just beneath the skin which inhibit excess heat loss from body and maintain body temperature.

46. Differentiate between shivering and non- shivering thermogenesis. **(3-times)**

Ans:

Shivering thermogenesis	Non shivering thermogenesis
The rate of heat production is increased by increased muscle contraction by movements or, by shivering so called as shivering thermogenesis.	Non shivering thermogenesis is the process in which no muscle contraction occurs while thyroxin hormone enhances the oxygen consumption in the body and heat is produced to maintain the body temperature.

47. Give adaptations of marine fish for its survival in cold environment. **(2-time)**

Ans: These fishes have a thick layer of insulating fat called blubber, which prevent excess heat loss from the body.

48. What are heterotherms? Give example. **(3-times)**

Ans: These are the animals that are capable of varying degrees of endothermic heat production but generally do not regulate their body temperature within a narrow range. For example bats and humming birds.

49. Write structural adaptations for regulation of heat exchange between animals and environment.

Ans: Structural adaptations in the animals for exchange of heat are sub-dermal fatty layer insulation called pelage, the presence of sweat glands and lungs modified for panting.

50. Define the process of panting with one example. **(2-times)**

Ans: It is structural adaptation for heat regulation in dogs. Panting is evaporative cooling in the respiratory tract for temperature regulation.

51. How animals thermoregulate in cold temperature?

Ans: Marine animals like seals and whales which live in cold water have thick layer of

insulating fat known as blubber. This fat layer prevents heat loss and maintain body temperature. Some animals have brown fat under skin which act as insulator and maintain body temperature. Some animals have thick fur in which air become still and prevent heat loss. Shivering and non shivering thermogenesis is also helpful in temperature regulation of the body.

Pyrexia

52. What are the pyrogens? Give their function. **(3-times)**

Ans: In bacterial and viral infections mainly leucocytes increase in number. These pathogens and the blood cells produce chemicals called pyrogens. Pyrogens upset the set point of hypothalamus above the normal point of 37 °C. Fever or high temperature helps in stimulating the protective mechanisms against the pathogen.

53. What is Pyrexia? **(2 times)**

Ans: In bacterial and viral infections mainly, leuckocytes increase in number. These pathogens and the blood cells produce chemicals called as pyrogens. Pyrogens displace the set point of hypothalamus above the normal point of 37°C. This fever or high temperature is known as pyrexia.

54. Why Leaves are said to be excretophore? **(2-times)**

Ans: The falling of yellow leaves in autumn is the seasonal time for the plants to get rid of the accumulated wastes and because of this reason leaves are said to be excretophore.

55. What is Glomerulus?

Ans: A ball of capillaries present in nephron is known as glomerulus. Glomerulus circulates blood through capsule as it arrives through afferent arteriole and leaves the capsule by efferent arteriole.

56. Why temperature of body increases during fever? Explain. **(2-times)**

Ans: In bacterial & viral infections mainly leuckocytes increase in number. These pathogens and the blood cells produce chemicals called as pyrogens. Pyrogens displace the set point of hypothalamus above the normal point of 37°C.

57. What is the evolutionary importance of ureotely and uricotely?

Ans: Animals have adopted different chemical nature of excretory products in relation to their habitats which depend upon availability of water. Animals excreting urea are called as ureotelic while those excreting uric acid are known as uricotelic. Ureotely and uricotely are evolutionary adaptations of nitrogenous waste in habitats with insufficient supply of water.

58. Write different methods of kidney stone removal.

Ans: These four treatments can be used for kidney stone removal:

(i) Shock wave lithotripsy (ii) Ureteroscopy

(ii) Percutaneous nephrolithotomy or percutaneous nephrolithotripsy

(iii) Open surgery

59. Describe role of aldosterone and anti diuretic hormone in kidney.

Ans: The active uptake of sodium in the ascending limb or thick loop of henle is promoted by the action of aldosterone. ADH helps in reabsorption of water from filterate in collecting tubules back to kidney.

60. What are xerophytes? Give two adaptations of xerophytes. / Write at least two characteristics of xerophytes. **(2-times)**

Ans: Plants growing in severly dry habitats are known as xerophytes. For example cactus.

Two adaptations are:

(a) Small, thick leaves (b) Stomata on lower side of leaf.

61. Differentiate between re-absorption and secretion in nephron.

Ans:

Reabsorption	Secretion
All the useful constituents of the glomerular filterate are reabsorbed in proximal tubules and when filtrate leaves proximal tubules, it mostly contains nitrogenous wastes.	The tubular epithelium also secretes substances into the lumen, this secretion is very selective and is mainly of hydrogen ions to balance pH value of the filtrate passing through the tubule.

62. Define anhydrobiosis. **(2-times)**

Ans: The ability of terrestrial animals to telerate dehydration is known as anhydrobiosis. For example, human beings can tolerate dehydration with the help of ADH.

63. Differentiate between haemodialysis and peritoneal dialysis.

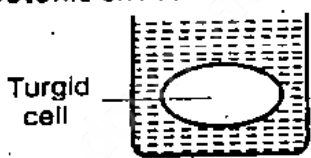
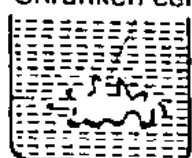
Ans:

Peritoneal dialysis	Haemodialysis
The abdomen of humans has a peritoneal cavity lined by a thin epithelium called peritoneum. Peritoneal cavity is filled with dialysis fluid that enters the body through a catheter. Excess water and wastes pass through the peritoneum into the dialysis fluid.	Haemodialysis means "cleaning the blood". In this procedure blood is circulated through a machine which contains a dialyzer also called an artificial kidney. Dialyzer has two spaces separated by thin membrane. Blood passes from one side of the membrane and dialysis fluid on the other. The waste and excess water pass from the blood through the membrane into the dialysis fluid.

64. Discuss the process of osmoregulation in mesophytes.

Ans: Mesophytes have moderate water availability. In sufficient supply of water stomata are kept open to promote loss of excess water, however in restricted supply stomata close to prevent the loss of water e.g Brassica, rose, mango etc.

65. Skin does not come within the definition of excretory organ. Comments.

Ans: Removal, of the salts with water by the sweat glands and sebum by sebaceous glands seems to be excretory in nature. The removal of water and salts from sweat glands is for the purpose of thermoregulation and of sebum on the skin is for protection against microorganism. Therefore in context of definition of excretion, skin may not be considered an excretory organ.

66. Define the given terms: (i) Hypertonic environment (ii) hypotonic environment.

Ans: "If extracellular environment of any cell is diluted solution compared to the cell concentration thus designated as hypotonic environment."

"The more concentrated external environment of any cell is called as hypertonic environment."

67. Compare Hypotonic environment with hypertonic environment.

Ans:

Hypotonic environment	Hypertonic environment
If extracellular environment is of diluted solution compared to the cell concentration, thus designated as hypotonic environment. Turgid cell Hypotonic (a)	The more concentrated external environment is termed as hypertonic environment. Shrunken cell Hypertonic (c)

68. What are "Malpighian Tubules"? In which organism they are found?

Ans: Terrestrial arthropods particularly in insects the excretory structures are adapted to collect excretory products from hemolymph in sinuses through suspended tublar structures called malpighian tubules. These malpighian tubules remove nitrogenous waste from the hemolymph.

69. Enlist the three steps in urine formation in human.

Ans: Three steps in urine formation in humans are:

1. Filtration 2. Reabsorption 3. Secretion

70. What is lithotripsy? How it takes place?

Ans: Lithotripsy is used for non – surgical removal of kidney stone. It is the technique used to break up stones that form in the kidney, ureter or gall bladder.

There are several ways to do it, although the most common is extracorporeal shock wave lithotripsy. High concentrations of X – ray or ultrasound are directed from a machine outside the body to the stone inside. The shock wave break the stone in tiny pieces or into sand, which are passed out of the body in urine.

71. Differentiate between Pyrexia and Pyrogens.

Ans:

Pyrexia	Pyrogens
Pyrexia is (label) fever. Temperature in fever is known as pyrexia.	Pyrogen is (medicine) any substance that produces fever, or rise in body temperature.

72. What are behavioural adaptations to regulate heat exchange between animals and environment?

Ans: These include making of the animal to an environment where heat exchange between these is minimal e.g, ground squirrels move to burrows in mid-day heat and lizards bask in the sun to gain heat. Animals also control the amount of surface area available for heat exchange by adjusting their postures.

73. What are excretophores? Give an example.

Ans: The leaves are destined to fall off, as in the case of autumn leaves in plants or die off as happens in the leaves in plants and stalk of certain bulbs e.g blue bell, leaving the bulb underground.

The falling of yellow leaves during autumn is the seasonal time for the plants to get rid of the accumulated wastes and because of this reason leaves are said to be excretophores.

74. Briefly describe hemodialysis.

Ans: Hemodialysis means 'cleaning the blood'. In this procedure blood is circulated through a machine which contains a dialyzer also called an artificial kidney Dialyzer has two spaces separated by thin membrane. Blood passes from one side of the membrane and dialysis fluid on the other. The wastes and excess water pass from the blood through the membrane into the dialysis fluid.

75. How loss of water is prevented in insects and terrestrial vertebrates?

Ans: In insects and terrestrial vertebrates rectum reabsorbs most of the salts and water, thus nitrogenous wastes are excreted as the solid excreta, in the form of uric acid crystals along the feces. This kind of adaptation in excretion is the success of these animals on land with acute shortage of water.

76. Account one each main adaptation in plants to high and low temperature.

Ans: Plants use evaporative cooling to manage with high temperature. Hot and dry weather, however, causes water deficiency resulting in closing of stomata, thus plants suffer in such conditions. Plants respond to cold stress by increasing proportion of unsaturated fatty acids, which help membrane to maintain structure at low temperature by preventing crystal formation.

77. Write two adaptations of hydrophytes.

Ans: Hydrophytes have the adaptations to remove the flooding of its cells in fresh water. In this type the surface area of leaves is very large to transpire water excessively. Extensive stomata are present on the upper surface facing the atmosphere to promote loss of water.

2 **78. What is flame cell, give its function?**

Ans: Tubular system in planaria is spread throughout the body and branches are capped by a cellular setup termed as flame cell. Each flame cell has a tuft of cilia, whose beating propels interstitial fluid into the tubular system (The beating of cilia look like a flickering flame, therefore these cells are termed flame cells).

79. How plants respond to cold stress?

Ans: The plants native to cold region such as oaks, maples, roses and other plants have adapted to bring changes in solutes composition of the cells, which cause cytosol to super cool without ice formation, although ice crystals may form in the cell walls.

80. Define panting and pyrogens.

Ans: **Panting:** Panting is the evaporative cooling in the respiratory tract, is the other mechanism studied in dogs.

Pyrogens: In bacterial and viral infection mainly leucocytes increase in number. These pathogens and the blood cells produce chemicals called pyrogens. Pyrogens upset the set point of hypothalamus above the normal point of 37c. Fever or high temperature helps in stimulating the protective mechanisms against the pathogen.

81. What is lithotripsy and? Give the mechanism of lithotripsy.

Ans: Ans: (Litho means stone, tripsy means breakdown) Break down of stone by passing radiations from the body is called lithotripsy.

Mechanism: High concentration of X-rays or ultra sounds are directed from a machine outside the body to stone inside. The shock waves break the stone in tiny pieces or into sand, which are passed out of the body.

82. What are poiklotherms? Give one example as well.

Ans: **Poikilotherms:** Animals whose body temperature varies according to external temperature of the animals which cannot maintain their body temperature are called poiklotherms.e.g., fishes

83. Define homeostasis. Give components of homeostasis control.

Ans: **Homeostasis:** The protection of internal environment from the harm of fluctuations in external environment is called homoeostasis.

Components: Water, solutes and temperature.(osmoregulation, excretion and thermoregulation)

84. Which nitrogen wastes are produced by the metabolism of purines and pyrimidine?

Ans: Nitrogen wastes are produced by the metabolism of purines and pyrimidine includes hypoxanthine, xanthine, uric acid, allantoin, urea and ammonia.

85. Differentiate between ureter and urethra.

Ans: **Ureter:** It is tube or duct through which urine leaves the kidney and reaches to urinary bladder.

Urethra: urine leaves the body during urination from the bladder through a tube called urethra.

86. What is vasodilation and vasoconstriction?

Ans: **Vasodilation:** During warm temperature the diameter of blood vessels increased and flow of blood to the skin is increased to dissipate the heat that cause cooling of body is called vasodialtion. **Vasoconstriction:** During cold temperature the diameter of blood vessels decreased and flow of blood to the skin is decreased to conserve the heat that cause warming of body is called vasoconstriction.

87. How arthropods and mammals overcome the problems of evaporative cooling?

Ans: Arthropods overcome evaporative cooling by having thick waxy cuticle (waxy exoskeleton) which is further hardened by calcium carbonate and some other materials.

Mammals overcome the evaporative cooling by having keratinized skin cells.

88. Distinguish between hyperglycemia and hypoglycemia.

Ans:

Hyperglycemia	Hypoglycemia
High level of calcium of blood calcium level is called hyperglycemia, It may cause kidney stone,	Low level of blood calcium is called hypoglycemia.

89. Define nephron. Give its types.

Ans: **Nephron:** The function unit of kidney is nephron. Each kidney has one million nephron which filters the blood and produce urine as waste product.

Types: Cortical nephron and juxamedallary nephron

90. Compare osmoregulation in marine fishes and fresh water fishes.

Ans :

Marine fishes	Fresh water fishes
Marine fishes for osmoregulation excrete salt through gills and also possess salt excreting organs such as reactal glands.like cartilaginous fishes maintain lower internal salt concentration than that of sea's water. Their kidneys	Fresh water fishes remove excess water by producing large volume of dilute urine. The loss of salt is compensated by active uptake of salts by gills and skin.

91. Describe thermostat function and feedback mechanism in human.

Thermostat function: Homeostatic thermostat is present in the hypothalamus, a brain part. It responds to change in the temperature above and below set point which is 37C°.

Feedback mechanism: It is a type of interaction in which a controlling mechanism is itself controlled by the products of reactions it is controlling.

LONG QUESTION'S OF CHAPTER-15 (HOMEOSTASIS) BOARD PAPERS 2011-21

1. Discuss major homeostatic functions of the liver.(2-times)
2. Describe briefly the structure of human nephrons (2-times).
3. Account the excretory system in earthworm.(3-times)
4. Draw and labeled diagram of nephron of kidney. Explain its function.
5. Highlight the role of liver as an excretory organ.(4-times)
6. Explain excretion in Planaria.
7. Define osmoregulation. How the animal osmoregulate in different environments?
8. Give various adaptations of plants to low and high temperature.
9. Draw a labeled diagram and explain the thermostat function of hypothalamus in human thermoregulation.
10. Explain thermoregulation in mammals.
11. Explain osmoregulation in marine animals.
12. Describe excretion in plants in details.(3-times)
13. Explain the adaptation in plants to low and high temperature (2-times)

14 Give osmoregulatory adaptations in terrestrial animals.
15 Elaborate adaptations in plants to high and low temperature.
16 Write note on renal failure and its treatment.
17 Discuss Kidney problems and cures.
18 Discuss excretion in Cockroach.
19 Explain Urinary System of Human.
20 Describe osmoregulation in plants.

OBJECTIVE (MCQ'S) OF CHAPTER-16 (SUPPORT & MOVEMENTS) BOARD PAPERS-2011-21

Support in plants

1. Bark is made up of **(2-times)**
(a) Cork ,cork cambium , pith and phloem (b) Cork , cork cambium cotex & phloem
(c) Wood , pith and Xylem (d) Xylem , phloem and cortex

2. In older trees, the active portion of the trunk is:
(a)Heart wood (b)Black wood (c)Annual growth ring (d)Sap wood

3. An increase in plant due to the activity of vascular cambium is called:
(a) Primary growth (b) Open growth (c) Secondary growth (d)Tertiary growth

4. Cambium is an example of **(2-times)**
(a) Apical meristem (b) Intercalary meristem (c) Lateral meristem (d) Apex

5. Fibers, sclereides and vessels are three types of **(4-times)**
(a)Collenchyma (b)Sclerenchyma (c)Parenchyma (d)Cambium

6. The group of cells usually lack secondary wall and have angular thickenings is
(a)Sclerenchyma (b)Collenchyma (c)Fibers (d)Vessels

7. The inactive non-conducting wood is called **(4-time)**
(a)Heart wood (b) Sapwood (c) Xylem (d) Phloem

8. This type of wood is most resistant to decay and insect attack:
(a) Callus (b) Hard wood (c) Heart wood (d) Sapwood

9. The collenchyma cells have protoplast and usually lack **(3-times)**
(a)Secondary wall (b) Primary wall (c) Cell membrane (d) Vacoule

10. The sclerenchyma cells found in seed coats and nut shell are the:
(a)Fibers (b) Vessels (c) Trachieds (d) Sclerieds

11.In plants, Turgor pressure is generated by high osmotic pressure of the: (2-times)
(A) Cytoplasm (B) Vacuole (C) Mitochondria (D) Chloroplast

12. The loss of water due to ex-osmosis from plant cells causes plant to:-
(a) Turgid (b) Swell (c) Wilt (d) Rupture

13. Which of the following cells have angular thickenings in their primary walls?
(a) Collenchyma (b) Sclerenchyma (c) Fibers (d) Vessels

14. Bundle caps in sunflower stem, are formed by
(a) Sclerenchyma (b) Parenchyma (c) Mesenchyma (d) Collenchyma

15. The cell wall of sclerenchymatous cells are usually impregnated with:
(A) Cutin (B) Pectin (C) Suberin (D) Lignin

16. The collenchyma and sclerenchyma are heavily lignified cells respectively present in:
(A) Cotex and phloem (B) Cortex and xylem (C) Xylem and phloem (D)Pericycle and cortex

Movement in plants

17. Auxin is also responsible for positive gravitropism of:
(a)Roots (b)Stems (c)Leaves (d)Branches

18.The movement in response to stimulus of touch i.e. climbing vines is called: (2-times)
(a)Phototropism (b)Geotropism (c)Thigmotropism (d)Hydrotropism

19. Opening of flower bud follows **(3-times)**
(a)Photonasty (b)Epinasty (c)Hyponasty (d)Haptonasty

20. Spontaneous movement due to internal cause are
(a)Autonomic (b)Paratonic (c)Tactic (d)Tropic

21. Plant movements due to external causes are (2-times)
(a)Turgor (b)Tactic (c) Growth (d) Paratonic
22. The growing of young stem moves in zig-zag fashion of the apex are
(a)Hyponasty (b)Epinasty (c)Nutation (d)Haptonasty
23. Action of venus fly trap is an example of:
(a)Nyctinasty (b)Haptonasty (c)Hyponasty (d)Photonasty
24. The hyphae of fungi show movements:
(a)thigmotropism (b)Chemotropism (c)Hydrotropism (d)Geotropism
25. The growth movements are of:
(a)Two types (b) Three types (c) Four types (d)Five types
26. The sleep movements of plants fall under the category of:-
(a) Growth (b) Tactic (c) Turgor (d) Tropic
27. Movement shown by sperms of liverworts , mosses, ferns towards archegonia is a:
(a) Chemotactic movement (b) Phototactic movement
(c) chemotropic movement (d) Phototropic sic movement
28. The upper surface of leaves in bud condition shows?
(A) Photonasty (B) Hyponasty (C) Haptonasty (D) Epinasty

Hydrostatic skeleton & Exo-skeleton

29. The process of moulting is controlled by the nervous system and a hormone is
(A) Aldosteron (B) Androgen (C) Ecdysone (D) Oxytocin

Bones and cartilage

30. The collagen of fiber of a bone are hardened by the deposition of (4-times)
(a)Calcium phosphate (b) Calcium carbonate (c) Calcium oxalate (d) Calcium silicate
31. The bones dissolving cells are (2-times)
(a)Osteoblasts (b) Stem cells (c)Osteocytes (d) Osteoclasts
32. The living cells of cartilage are called:
(a)Osteoblasts (b)Osteocytes (c)Chondrocytes (d)Osteoclasts
33. Which bone provides attachment site for muscles? (2-times)
(A) Compact bone (B) Spongy bone (C) Soft bone (D) Cartilage
34. Bone forming cells are known as:
(A) Osteoblasts (B) Osteocytes (C) Osteoclasts (D) Chondroblasts

Human skeleton

35. Number of thoracic vertebrae in the thoracic region is
(a) 8 Vertebrae (b) 10 vertebrae (c)12 Vertebrae (d)14 Vertebrae
36. The axial skeleton includes:
(a)Vertebrae (b) Pelvic girdle (c) Pectoral girdle (d)Limbs
37. The fusion of four posterior vertebrae present in pelvic region form: (2-times)
(a)Cervical (b) Coccyx (c) Lumber (d) Sacrum
38. The vertebral column of human consist of vertebrae (2-times)
(a)31 (b)32 (c)33 (d)34
39. A bone which connects scapula with sternum:
(a)Humerus (b)Ischium (c)Pubis (d)Clavicle
40. Femur, tibia and fibula are the bones of (2-times)
(a)Neck (b) Skull (c) Fore limb (d) Hind limb
41. The number of cervical vertebrae is
(A) 7 (B) 12 (C) 33 (D) 22
42. Seven vertebratae which lie in the neck region are called:
(A) Lumbar vertebrae (B) Thoracic vertebrae (C) Pelvic vertebrae (D) Cervical vertebrae

43. Which of the following is a bone of axial skeleton
(a) Humerus (b) Femur (c) Tibia (d) Rib

44. The number of pelvic vertebrae in vertebral column of man is:
(A) 5 (B) 7 (C) 9 (D) 12

Joints

45. Fibrous joints are found in:
(a) Skull (b) Leg (c) Arm (d) Chest

46. Joints that are held together by short fibers embedded in connective tissue:
(a) Fibrous joints (b) Cartilaginous joints (c) Synovial joints (d) Hinge joints.

47. The joint that allows the movements in two directions
(A) Cartilaginous joints (B) Synovial joints (C) Hinge joints (D) Ball and socket joint

Deformities of skeleton

48. The disease which causes immobility and fusion of vertebral joints is called:
(a) Sciatica (b) Arthritis (c) Rickets (d) Spondylosis

49. In microcephaly, the individuals are born with small:
(a) Eyes (b) Hands (c) Legs (d) Skull

50. Rickets is caused by deficiency of **(3-times)**
(a) Vitamin A (b) Vitamin B (c) Vitamin C (d) Vitamin D

51. A disease caused by low calcium in the blood is called **(3-times)**
(a) Cramp (b) Paralysis (c) Tetany (d) Tetanus

52. Rickets in children results in bowed legs and deformed:
(a) Head (b) Pelvis (c) Chest (d) Pectoral girdle

53. A condition in which palatine processes of maxilla and palatine fail to fuse is called: **(3-times)**
(a) Cleft palate (b) Microcephally (c) Cretinism (d) Myxedema

54. Acute forms of arthritis usually result from:
(a) Bacterial invasion (b) Viral invasion (c) Fungal invasion (d) Severe injury

55. Sciatica is characterized by stabbing pain radiating over the course of
(A) Sciatic artery (B) Sciatic nerve (C) Sciatic vein (D) Sciatic capillary

56. Which one is not a joint disease? **(2-times)**
(A) Arthritis (B) Disc slips (C) Spondylosis (D) Sciatica

57. Bowed legs and deformed pelvis are the symptoms of which disease in children?
(A) Rickets (B) Disc slip (C) Sciatica (D) Haematoma

Mulscles

58. What is mortality rate in developing countries due to tetanus?
(a) 35 % (b) 40% (c) 45% (d) 50%

59. Muscles are attached to bones with a bundle of collagen called tendons that is --------- in nature: **(3-times)**
(a) Elastic (b) Non - elastic (c) Fluid (d) Semi fluid

60. Tetanus is caused by:
(a) Bacteria (b) Virus (c) Fungi (d) Protists

61. Cramp is also known as:
(a) Tetany (b) Tetanic contraction (c) Tetanus (d) Muscle fatigue

62. Muscle fatigue is caused by accumulation of:
(a) CO_2 (b) Fumaric acid (c) Lactic acid (d) Alcohol

63. Complete immobilization of muscle leads to **(2-times)**
(a) Increase in capillaries (b) Increase in mitocondria
(c) Severe atrophy (d) Resistance to fatigue.

64. **The skeletal muscles are attached with the bones through the (2-times)**
(a)Ligament (b) Tendons (c)Sarcolemma (d)Myofibrils.

65. **Slightly elastic connective tissues that attach bone to bone are called:**
(a)Tendons (b)Brachialis (c)Brachioradialis (d)Ligament

66. **Thick filament in myofibril is made up of:**
(A) Actin (B) Myosin (C) Tropomyosin (D) Troponin

67. **Skeletal muscles are called striated (stripped) because of presence of:**
(A) Red and Yellow bands (B) White and yellow bands
(C) Alternating dark and light bands (D) Red and black bands

68. **Skeletal muscle fibres have diameter:**
(A) 100-200 μm (B) 10-100 μm (C) 0-10 μm (D) 100-1000 μm

Arrangement of muscles for skeleton movement

69. **Which end of the muscle remains fixed when the muscle contracts?**
(A) Insertion (B) Origin (C) Tendon (D) Belly

70. **Which of the following muscle straightens the elbow joint?**
(A) Brachialis (B) Triceps (C) Biceps (D) Brachioradialis

Locomotion in jelly fish

71. **Which animal moves by jet-propulsion?**
(A) Earth warm (B) Star fish (C) Snail (D) Jelly fish

72. **Jelly-fish has an umbrella-like body called:**
(A) Bell (B) Jug (C) Vase (D) Shoe-flower

Locomotion and skeleton in vertebrates

73. **Which of the following is plantigrade?**
(a)Dog (b) Horse (c) Rabbit (d) Monkey

74. **The mammals who walk on the tips of the toes, modified into hooves are termed as (2-times)**
(a)Plantigrade (b)Unguligrade (c) Digitigrade (d)Brachigrade

75. **Which animal shows digitigrade mode of locomotion: (2-times)**
(a) Bear (b) Deer (c) Rabbit (d)Horse

2018

76. **The membrane that bounds vacuole is called:**
(a) Primary cell (b) Vascular wall (c) Pelicle (d) Tonoplast

77. **In birds, the sternum is modified to form:**
(a) Keel (b) Neck (c) Rib (d) Clavicle

78. **Euglena is able to change its direction by the active contraction of:**
(a) Undulating membrane (b) Myonemes (c) Flagella (d) Cilium

79. **Digitigrade mammals tend to walk on their:**
(a) Soles (b) Digits (c) Tips of the toes (d) Tips of the fingers

80. **The synovial joint is surrounded by a layer of connective tissue called:**
(a) fibrous capsule (b) hyaline cartilage (c) annulus fibrosus (d) hematoma

2019

81. **Proteins that bind to calcium in muscle contraction:**
(A) Actin (B) Myosin (C) Tropomyosin (D) Troponin

82. Osteomalacia includes a number of disorders in which bones receive inadequate:
(A) Water (B) Oxygen (C) Blood (D) Minerals

83. Each A-band has a lighter stripe in its mid section called:
(A) A-Zone (B) H-Zone (C) M-Line (D) Z-Line

84. The inflammatory degenerative disease of joint is:
(A) Arthritis (B) Sciatica (C) Herniation (D) Spondylosis

85. The collenchymatous cells are highly lignified and found in the:
(A) Epidermis (B) Cortex (C) Pith (D) Xylem

86. Tube feet are locomotory organs of:
(A) Jelly fish (B) Silver fish (C) Cuttle fish (D) Star fish

87. Tetany is a disease caused by:
(A) low calcium in blood (B) low vit. D in blood
(C) low sugar in blood (D) high calcium in blood

2021

88- Which one of the given is paired bone in cranium?
(A) Frontal (B) Occipital (C) Sphenoid (D) Temporal

89- Arthritis is an inflammatory or degenerative disease that damage:
(A) Muscles (B) Brain (C) Joints (D) Kidney

90- Primary growth in plants is caused by
(A) Lateral meristem (B) intercalary meristem
(C) Apical meristem (D) secondary meristem

91- The beginning of bone formation, starts after injury
(A) 3 — 4 weeks (B) 2 — 3 months (C) 8 weeks (D) 8 —12 weeks

92- The most common chronic arthritis which is a degenerative joint disease, also caused by
(A) Hormonal defects (B) genetic defects (C) nutritional defects (D) neural defects

93- The long tubular Sclerenchyma cells found in xylem are
(A) Fibers (B) Sclereides (C) Vessels (D) Cork cells

94- All the following bones are associated with appendicular skeleton except
(A) Femur (B) Radius (C) Ulna (D) Ribs

95- Which one is needed to break the link between Myosin Bridge and actin?
(A) Glucose (B) ATP
(C) Crentine (D) Creatine phosphate

96- Tropomyosin is a complex of how many polypeptide chains?
(A) Single (B) Double (C) Triple (D) None

97- A group of diseases in which bone resorption out paces bone deposit is known as:
(A) Osteoporosis (B) Osteoarthritis (C) Osteomalacia (D) Arthritis

98- The earliest form of muscles to evolve was:
(A) Smooth muscles (B) Cardiac muscles
(C) Skeletal muscles (D) Voluntary muscles

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B	D	C	C	B	B	A	C	A	D	B	C	A	A	D
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
B	A	C	B	A	D	C	B	B	B	C	A	D	C	A
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
D	C	A	A	C	A	B	C	D	D	A	D	D	C	A
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
A	C	D	D	D	C	B	A	A	B	D	A	B	B	A
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
B	C	C	B	D	B	C	C	B	B	D	A	D	B	C
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
D	A	B	B	A	D	D	B	A	B	D	A	D	C	C
91	92	93	94	95	96	97	98							
A	B	C	D	B	C	A	A							

SHORT QUESTION'S AND ANSWER'S OF (SUPPORT & MOVEMENTS) CHAPTER-16 BOARD PAPERS 2011-21

Support in plants

1. Differentiate between sapwood and heart wood **(2-times)**

Ans:

Sapwood	Heart wood
Sapwood is living part of wood which is light in colour and lies outside the heart wood. It conducts water and minerals to the plant body.	**Heart wood** is the non living part and lies in the center of the plant, it is dark in colour and non conducting part of wood.

2. What is callus and its role? **(3-times)**

Ans: Callus is a mass of undifferentiated cells. It heals the wound of plant.

3. Characterize phase of plant growth.

Ans: Zone of cell division, zone of cell elongation, zone of cell differentiation and zone of cell specialization.

4. Define tonoplast, give its function as well.

Ans: The wall of vacuole is called tonoplast, it is single membrane. It maintains the turgor pressure and solute concentration.

5. Characterize collenchyma cells. / Write two characteristics of collenchyma tissues. **(2-times)**

Ans: Collenchyma are living cells which lack secondary wall with angular thickenings. It provides support to the young plants.

6. Give two roles of vascular cambium.

Ans: Vascular cambium performs secondary growth of plant.
Secondary xylem is produced which act as wood and also give support to plant.
It also produces annual rings by which we can calculate age of plant.

7. Give two differences between animals and plants movements.

Ans: Plants show movement but remain fixed at their position. Their movement is shown by change in their growth.

Animals show their movement by changing their position; their movement does not involve any growth.

8. Name two types of sclerenchymatous cells. Give their function.

Ans: Sclerenchyma cells are non living with highly thick secondary walls due to deposition of lignin with high tensile strength. It provides support to plant body. Two types of sclerenchyma cells are fibers & sclerieds.

9. Differentiate between vascular and cork cambium. (2-times)

Vascular cambium	Cork cambium
Vascular cambium is the meristematic tissue found between primary xylem and primary phloem. Vascular cambium gives rise to two new tissues, one is the secondary xylem and other is secondary phloem. It brings about secondary growth of plant.	It is secondary meristematic tissue. Its activity produces cork towards outside. It has simple structure. It is composed of single types of cells. Cork has dead cells without spaces. It is less permeable to water. It is brown or yellow in color. It is lighter in weight.

10. Differentiate between fibres and sclerieds. (2-times)

Ans:

Fibers	Sclerieds
These are long and cylindrical with pointed ends. They may exist in solid bundles in xylem or as bundle cap. These provide support.	These are shorter than fibres with reduced lumen and having thick secondary wall. These are found in seed coat, nut shell and provide protection.

11. Which tissues arise from vascular cambium?

Ans: Secondary xylem, secondary phloem (wood), bark

12. Define collenchyma cells. / What are collenchyma cells? discuss. / Describe the structure and function of collenchyma cells. (2-times)

Ans: Collenchyma cells have protoplast and lack secondary wall. They have angular thickening in their inner walls. They are living cells and give support to plant cells.

13. Define secondary growth, give its significance. (2-times)

Ans: Secondary growth means increase in girth of root or stem (plant).

Significance: it form secondary xylem which act as wood.

Growth rings are formed which are helpful in calculating plant age.

Movement in plants

14. What are nastic movements? (3-times)

Ans: These are non directional movement of parts of plant in response to external stimuli.

15. Define nutation.

Ans: Zigzag movement of growing tips of vines along an object is called nutation. For example growing tip of climbing plants or vines show nutation.

16. Define geotropism. (2-times)

Ans: Response of plant parts to the gravity is called geotropism. Roots show positive geotropism and stem shows negative geotropism.

17. What is pulvinus (2-times)

Ans: These are the parenchymatous cells which are present at the base of petiole of some plants. They store water and play role in the opening and closing of leaves by changing their turgor pressure.

18. Differentiate between phototactic and phototropic movement (4-times)

Ans:

Phototactic	Phototropic
Phototactic is a type of tactic movement in which movement occurs in response of light stimulus.	Phototropic movement is a growth movement due to light stimulus.

19. Define chemotactic movement. Write its causes.

Ans: The movement of entire cell or organism in response to chemical is called chemotactic movement. The movement may be towards chemical stimulus (positive chemotactic) or away from chemical stimulus (negative chemotactic). For example movement of sperm towards archegnia in bryophytes in response to chemical which oozes out of opening of archegonium.

20. What is turgor pressure?

Ans: When water enters the cell of plant it reaches in the vacuole and it exerts pressure on the wall of the cell which is called turgor pressure.

21. Define phototactic movement and photonastic movement.

Ans: Phototactic movement is a type of tactic movement in which movement occur in response to light stimulus.

Photonastic movements that in which photoperiod is critical in opening and closing of flowers.

22. Write down the mechanism of rapid movements of leaflets.

Ans: When *Mimosa* (Touch me not) leaf is touched, it rapidly loss its turgor pressure due to exosmosis which results in closing of leaves. K^+ ions also play role in this movement.

23. Explain the term epinasty and hyponasty **(2-times)**

Ans: **Epinasty** is shown by leaves, petals etc. the upper surface of leaf in bud condition shows more growth as compared with lower surface. This leads to opening of buds.

Hyponasty: If growth in the lower surface of the leaf in bud condition is more than that of upper surface then buds remain close and it is called hyponasty.

24. Differentiate between geotropism and hydrotropism.

Ans:

Geotropism	Hydrotropism
The movement of plant parts in response to gravity is called geotropism.	The movement of plant parts in response to water is called hydrotropism.

25. What are phototactic movements? / With its examples. / Define phototactic movements? **(2-times)**

Ans: The movement of entire cell or organism in response to light is called phototactic movement. The movement may be towards source of light (positive phototactic) or away from light (negative phototatic). The best example of positive phototactic is movement of chloroplast due to cyclosis to absorb maximum light for photosynthesis.

26. Define tactic movements. Give its one type.

Ans: The movement of entire organism or cell i.e., locomotion due to external stimulus is called tactic movement.

27. Differentiate between photonasty and thermonasty.

Ans:

Photonasty	Thermonasty
It is non directional movement of plant parts in response to external stimulus which is light. For example flowers open and close due to light intensity.	It is non directional movement of plant parts in response to external stimulus which is temperature. For example tulip flowers close at night due to rapid growth on lower side of petals.

28. Compare photonasty with thermonasty.

Ans:

Photonasty	Thermonasty
The principal stimulus is light duration. The flowers open and close due to light intensity.	It is due to temperature. The flowers of tulip close at night because of rapid growth in the lower side by upward and inward bending of the petals.

Hydrostatic skeleton & Exo-skeleton

29. Give any two major functions of skeletal system in animals.

Ans: It provides support and movement to the animal body.

30. What are disadvantages of exoskeleton? **(3-times)**

Ans: Disadvantages of exoskeleton are

i. It restricts the growth of animal.

ii. It is nonliving.It has to be shed periodically and new skeleton should be made.

31. Define ecdysis and give its four stages. OR Describe various stages of ecdysis. OR What is moulting? Write its stages. **(5-times)(2018)**

Ans: Arthropods need to shed their exoskeleton periodically and replace it with one of the large size. This process is called ecdysis or moulting.

Its steps are:

i. Enzymes secreted from hypodermal glands, begin digesting the old endocuticle. This digestion separates hypodermis and the exoskeleton.

ii. Secretion of new procuticle and epicuticle.

iii. The old exoskeleton splits and pores are formed.

iv. Finally new exoskeleton is hardened by deposition of calcium carbonate.

32. Give two modifications in the exoskeleton of arthropods.

Ans: Modification of exoskeleton in arthropods is as follow

Formation of sensilla (bristle), lenses and modification for gaseous exchange.

33. Differentiate between exoskeleton and endoskeleton.

Ans:

Endoskeleton	Exoskeleton
Endoskeleton is advance form of skeleton. It is living skeleton and cause swift movement of animal with the help of muscles. It lies inside the body of animal.	**Exoskeleton** is primitive type of skeleton which is non living and hinder the movement of animal.

34. Compare epicuticle and procuticle

Ans:

Epicuticle	Procuticle
Epicuticle is the outer most layers. It is made up of waxy lipoprotein, so it is impermeable to water and serves as a barrier to micro-organisms and insects.	Procuticle is composed of chitin, tough, leathery polysaccharide and several kinds of proteins.

35. Write chemical composition of exoskeleton in Mollusca and arthropoda.

Ans: In marine bivalvia and snail (mollusks) the shell is mainly composed of crystals of calcium carbonate. The shell of land snail generally lack hard minerals.

In arthropods the exoskeleton is mainly composed of chitin which is further hardened by the deposition of calcium carbonate, waxy lipoprotein.

36. Define mechanism of hydrostatic skeleton. / What is hydrostatic skeleton? Give its examples.

Ans: In animals that lack a hard skeleton, a fluid filled gastrovacular cavity act as hydrostatic skeleton. Hydrostatic skeleton provides support and resistance to contraction of muscles so that, motility results. It is found in annelids, cnidarians and arthropods.

37. Why does ecdysis take place in insects? / Why moulting takes place in Arthropodes? **(2-times)**

Ans: Actually arthropod exoskeleton is nonliving and animal cannot grow larger. The

animal therefore needs to shed exoskeleton periodically and replace it with new one of larger size. So thats why insects have to do ecdysis.

Endoskeleton

38. Give role of skeleton in mineral homeostasis and blood cell production.

Ans: **skeleton in mineral homeostasis:** Bones serve as a reservoir for calcium, phosphate, sodium and potassium. Through negative feedback mechanism, bones can release or take up minerals to maintain homeostasis.

Blood cell production: Red and white blood cells are produced in bone marrow, a connective tissue found within certain bones.

39. Define is cartilage? Give its two types. **(2-times)**

Ans: Cartilage is much softer than bones. It is form of connective tissues. It covers the ends of bones at joints and also supports the flexible portion of nose and external ear. The living cells are called chondrocytes. Its types are fibro cartilage and Hyaline cartilage.

40. Differentiate between cartilage and bones.

Ans:

Cartilage	Bones
Cartilages are soft connective tissues.	Bones are hard connective tissues.
Cartilage includes only one part.	Bone has two parts outer spongy and inner hard bone part.
Cartilage has only chondrocytes.	Bones consists of three types of cells like osteoblasts, osteoclasts and osteocytes.

41. Differentiate between Fibro (elastic cartilage) and hyaline cartilage. (3-times)

Fibro cartilage (elastic)	Hyaline cartilage
It has matrix containing bundles of collagen fibers. It forms external pinna and epiglottis.	It is most abundant in human body. It is found at the moveable joints.

42. Which kinds of cells are responsible for bone formation? Give their name.

Ans: Three types of bone forming cells are

i. Osteoblast: Bone forming cells

ii. Osteoclast: bone dissolving cells

ii. Osteocytes: bone maturing cells

43. Describe main type of cartilage.

Ans: There are two main types of cartilage

i. Hyaline cartilage: it is most abundant type in human body. It is found at moveable joints.

ii. Fibro cartilage; it has matrix consisting bundles of collagen fibres. It forms external pinnae of ear and the epiglottis.

Human skeleton

44. Name any two parts of hind limb. **(2-times)**

Ans: Femur, tibia and fibula.

45. Write the name of two bones of cranium.

Ans: Bones of cranium include parietal and temporal bones.

46. Name the bones of pelvic Girdle.

Ans: Ilium, Ischium and pubis.

47. Name unpaired facial bones.

Ans: Mendible and vomer are unpaired facial bones.

48. Name bones of human pectoral girdle.

Ans: Scapula, supra scapula and clavicle.

49. Give classification of vertebral column.

Ans: Vertebral column has been divided into four regions cervical region has seven vertebrae, thoracic region has 12 vertebrae, lumber region has nine vertebrae, pelvic region has two sets, sacrum and coccyx. Sacrum has five anterior fused vertebrae while coccyx has four posterior fused vertebrae.

50. Name two paired facial bones.

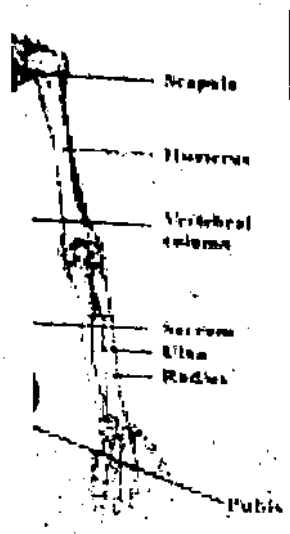
Ans: The two paired facial bone are temporal and parietal bones.

51. Name different bones of Hind Limb.

Ans: Bones of hind limb are femur, tibia, fibula, tarsals, metatarsals, phalanges.

52. Name the unpaired cranial bones.

Ans: Ethmoid, frontal, occipital and sphenoid are unpaired cranial bones.

53. Sketch and label fore limb of human.

54. Describe pelvic and pectoral girdle in human skeleton.

Ans: Pelvic girdle attaches the hind limbs to the vertebral column. It consists of two coxal bones. Each of which is formed by the fusion of three bones ilium, ischium and pubis. Pectoral girdle comprises scapula, supra scapula and clavicle. Clavicle connects scapula with sternum.

55. Differentiate between axial and appendicular skeleton.

Ans:

Aial Skeleton	Appendicular Skeleton
Axial skeleton includes skull, vertebral column and ribs sternum.	Appendicular skeleton includes pectoral girdle and appendages (fore limbs), and pelvic girdle and appendage (hind limbs).

Joints

56. Explain the ball and socket joints and give an example. (5-times)

Ans: Joints which can move or rotate in more than one plane are called ball and socket joints like shoulder and hip joint.

57. What are the differences between hinge joint and ball and socket joint? OR Compare hinge joint with ball & socket. (6-times)

Ans:

Hinge joint	Ball and Socket joint
These are the joints which can move only in one plane are called hinge joints like elbow and knee joint.	Joints which can move or rotate in more than one plane are called ball and socket joints like shoulder and hip joint.

Deformities of skeleton

58. What is herniation? Or disc slip? / What is herniation of disc? (3-times)

Ans: Severe or sudden physical trauma to spines may result in herniation. The herniated disc usually involves the rupture of annulus fibrosus followed by protrusion of the spongy nucleus pulposus.

59. What do you know about rickets? OR Define rickets. Suggest its remedy. Write few lines of disease Rickets. (4-times)

Ans: It is a disease of children with bowed bones of legs and deformed pelvis. It is caused by calcium deficiency in diet or deficiency of Vitamin-D. It is treated by Vitamin-D' fortified milk and exposing skin to sunlight to cure disorder.

60. Give symptoms and causes of sciatica. / What is Sciatica? **(2-times)**

Ans: It is characterized by stabbing pain radiating over the course of sciatic nerve. It is caused due to injury of proximal sciatic nerve, which might follow a fall, a herniated disc or improper administration of an injection in to the buttock.

61. What is microcephally? **(2-times)**

Ans: It is a genetic disorder in which skull bones are not fully developed and remain small in size and development of brain does not occur properly so person is mentally poor.

62. What is Osteoporosis? Write its treatment. / Why it occurs in aged woman. **(2-times)**

Ans: It is a group of diseases in which bone deposition outpace bone deposit. In this case bone mass is reduced and chemical composition of the matrix remain normal. Osteoporosis mainly occurs in aged women, which is related to decreased estrogen level. Other factors may contribute include, insufficient exercise, diet poor in calcium and protein, smoking.

Estrogen replacement therapy offers the best protection against osteoporatic bone fracture.

63. What is arthritis?

Ans: Arthritis is inflammatory or degenerative disease that damage joints. It results in pain, stiffness, swelling of the joints. Acute form of arthritis usually results from bacterial infection and are treated with antibiotics. The membrane lining the joints thickens; fluid production is decreased, which in turn leads to increased friction. Chronic arthritis includes osteoarthritis, rheumatoid arthritis and gouty arthritis.

Repair of broken bone

64. State hematoma formation briefly **(3-times)**

Ans: When bone breaks, bleeding occur and as a result haematoma formation occurs. Soon after bone cells deprived of food begin to die and the tissue at the fracture site becomes swollen and hence painful.

Smooth muscles:

65. What are the characteristics of smooth muscles? **(3-times)**

Ans: Smooth muscle are non striated and involuntary as well as unbranched. They produce movement in body on contraction.

Cardiac muscles

66. Write few lines about cardiac muscles.

Ans: These are muscles of heart. They constitute most of the heart walls. Heart muscle is composed of single chain cell, each with its own nucleus. The chain of cells is organized into fibres that are branched and inter connected. So we can say cardiac muscles are striated and involuntary.

Mulscles

67. What is rigor mortis? **(6-times)**

Ans: After the death of a person, the ATP are reduced and cross bridges are not broken and muscles become stiff, this condition is known as rigor mortis.

68. How the muscle fatigue is resulted? **(5-times)**

Ans: When we do hard exercise, an aerobic respiration starts in the muscle and lactic acid is accumulated which results muscles fatigue.

69. How does tendon differ from ligament? / Differentiate between tendons and ligament. **(5-times)**

Ans:

Tendon	Ligament
Tendons attach bone to muscle and are non elastic.	Ligaments attach bone to bone and are slightly elastic.

70. Write a brief note on tetany.

Ans: It is a disease caused by low calcium level in blood. It increases the excitability of neurons and results in loss of sensation. Muscle twitch and convolutions occur. If untreated the system progresses to spasm of larynx, respiratory paralysis and resulting death.

71. What is cramp? Give its two causes. / What is Cramp? (6-times)

Ans: It is known as tatanic contraction of entire muscle. It lasts for few seconds or several hours causing muscles to become taut and painful. It is most common in thigh and hip muscles, it usually occurs at night or after exercise. It reflects low blood sugar level, electrolyte deficiency, dehydration, irritability of spinal cord and neurons.

72. What is the difference between tetanus and muscular tetany? (2-times)

Ans:

Tetnus	Muscular tetany
Tetnus is a term used for acute infectious diseases caused by anaerobic bacteria *Clostridium tetni* resulting in persistent painful spasm of some skeletal muscles. Typically begins gradually with stiffness of jaws and neck muscles and progresses to fixed rigidity of jaws (lock jaws) and spasm of trunk and limb muscles, usually fatal to respiratory failure.	Tetany is a disease caused by low calcium level in blood. It increases the excitability of neurons and result in loss of sensation. Muscle twitch and convolutions occur. If untreated the system progresses to spasm of larynx, respiratory paralysis and resulting death.

73. What is effect of exercise on muscles?

Ans: The amount of work a muscle does is reflected in changes in the muscle itself. When muscles are used actively they increase in size or strength and become more efficient and fatigue resistant. Aerobic exercise such as swimming, jogging and fast walking results in several changes in skeletal muscles. Capillary surrounding the muscle fibres as well as mitochondria in them increase in number and fibre synthesizes more myoglobin. These changes results in more efficient muscle metabolism and resistance to fatigue. Complete immobilization of muscles leads to muscle weakness and severe atrophy.

Arrangement of muscles for skeleton movement

74. Differentiate between brachialis from brachioradialis.

Ans:

Brachialis	Brachioradialis.
Brachialis is inserted in the ulna and it lifts the ulna during flexion.	brachioradialis is inserted in radius and it lifts the radius during flexion.

75. What is antagonistic action of muscles? OR Define antagonistic movement of muscles.

Ans: When muscles occur in pairs and work in opposite direction this movement is called antagonistic movement.

Muscles which cause antagonistic movement are antagonistic muscles. One muscle contract and other relax and then second contract first one is relaxed causing the antagonistic movement.

Locomotion in protoctista

76. How a cilium beats and helps in locomotion of Paramecium according to suggestion of Bradford?

Ans: According to Bradford suggestion a cilium contracts in two steps

i. Five out of none double fibrils contract or slide simultaneously cilium bend or shorten. This is called effective stroke.

ii. The four out of nine double fibrils contract and cilium become straight. It is called recovery stroke.

77. Differentiate between effective stroke and recovery stroke. (2-times)

Ans:

Effective stroke	Recovery stroke
In Paramecium five out of nine double fibrils contract or slide simultaneously cilium becomes bent or shorten. It is called effective stroke.	Four out of nine double fibrils contract and cilium become straight. It is called recovery stroke.

Locomotion in jelly fish

78. Discuss jet propulsion. / What is jet propulsion. Explain with an example. (2-times)

Ans: Jelly fish has an umbrella like body called bell. First of all water enters in the bell then the bell contracts, the water is forced out like a jet and the animal move forward. This movement is known as jet propulsion.

Locomotion and skeleton in vertebrates

79. How does active flight in birds differ from passive flight? / Differentiate between Active flight and passive flight. (6-times)

Ans:

Active flight	passive flight
During the active flight very little or no support can be gained from upward air currents but can be achieved by flapping the wings. As the bird moves through the air, the air flows more quickly over the curved upper surface than over the lower surface. This reduces the air pressure on the top of wing, compared with air pressure below the wing, which gives lift to the bird.	In passive flight when bird glides, the wings act as aerofoil. The air flows over the wings in such a way that the bird is given a lift, the amount of lift depends on the angle at which the wing is held relative to the air stream.

80. Define plantigrades with example. (3-times)

Ans: Animals which walk on the sole. When they walk their sole and toes touch the ground are called plantigrades. e.g., Human, bear and monkey.

81. Define aerofoils.

Ans: An aerofoil is any smooth surface which moves through the air at an angle to the air stream for example wing of a bird act as an aerofoil.

82. Characterize digitigrades animals. (3-times)

Ans: Animals which walk on the tips of their digits only are called digitigrades. They run faster than plantigrade animals. In these animals first digit usually reduces or completely lost as in rabbit, rodents.

83. Differentiate between plantigrade and unguligrade mammals.

Ans:

Plantigrades	Unguligrades
In this type of locomotion the mammals walk on their soles with palms, wrist and digits all rest more or less on ground such as monkey, apes and man.	Unguligrades are the mammals walk on the tips of toes modified into hoof as deer, goat etc. It is most swift type of locomotion.

Evolutionary changes in the arrangement of bones and related mode of locomotion in major groups of vertebrates.

84. What is foramen triosseum? How it is formed?

Ans: In birds the lifting action is possible because the tendon of the supra coracoid muscles pass through an opening called foramen triosseum formed between the scapulacoracoid and clavical bones is attached to the upper surface of the humerus.

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85. How does digitigrade differ from unguligrade?

Ans:

Unguligrade	Digitigrade
1. These animals walk on the tips of toes modified into hoof as deer, goat. 2. It is the most swift type of locomotion.	1. Some mammals tend to walk on their digits only. 2. They run faster than plantigrade animals. 3. In these mammals first digit usually reduces or completely lost as in rabit, rodents etc.

86. What is ball and socket joint?

Ans: The joint that allows the movement in several directions. Such joints have at least two pairs of muscles present perpendicular to each other. They provide maximum flexibility. Hip joint & shoulder joints are the examples of ball & socket joints.

87. Define remodeling.

Ans: After several months bony callus is remodeled by the excess material on the outside of the bone. Final structure of remodeled area resembles that of the original unbroken bone because it responds to the same set of mechanical stimuli.

88. What is active flight?

Ans: When little or no support can be gained from upward air currents, the same effect can be achieved by flapping the wings. As the bird moves through the air, the air flows more quickly over the curved upper surface than over the lower surface. This reduces the air pressure on the top of the wing, compared with air pressure below the wing. There is, therefore, a net upward pressure on the wing which gives lift to the bird.

89. What is "All or None response"?

Ans: The contraction of each muscle fibre is based on all or none principle i.e all of its fibrils participate in contraction. The degree of contraction depends upon the number of fibers that participates in contraction.

90. What is cause and symptoms of Rickets?

Ans: Rickets is caused by deficiency of calcium or vitamin D in diet. Its symptoms include children with bowed legs and deformed pelvis.

91. Differentiate between the compact bone and spongy bone. Give only two differences.

Ans:

Spongy Bone	Compact bone
1. Spongy bone is light and highly porous. 2. It is rich in blood vessels.	1. Compact bone is strong and dense. 2. It is devoid of blood vessels.

92. Give the name of hormones which are involved in epinasty and hyponasty.

Ans: Epinasty is due to auxins and hyponasty is due to gibberellins.

93. What Is an exoskeleton? Name its two layers.

Ans: An exoskeleton is hardened outer covering to which internal muscels are attached. It is secreted by the ectoderm in animal cells. It is composed of two layers the names of which are as follows.

i. Apicuticle ii. Procuticle

94. What is sliding filament model?

Ans: When muscle fibre contracts, the thin and thick filaments udergo shifting. The I-band reduces in length and Z-line gets closer. H. Huxley and A.F. Huxely and their colleagues suggested a hypothesis in 1954 to explain all events in muscle contraction, this is called " Sliding filament model" of muscle contraction.

95. Give two characters of smooth muscles.

Ans: Smooth muscles are long & spindle shape with each containing a single nucleus. It has no striations.

96. What is Vascular Cambium? Give its function.

Ans: "Vascular cambium first appear as a cylinder of actively dividing cells between primary xylem and primary phloem."

Vascular cambium gives rise to two new tissues, one is the secondary xylem next to the inner surface of the vascular cambium, the other is the secondary phloem appearing outer to the vascular cambium.

97. Define moulting (Ecdysis). Give its one importance.

Ans: "Arthropods shed their exoskeleton periodically and replace it with one of the larger size. This process is known as ecdysis or moulting."

Advantage of ecdysis is that animal can grow larger in size while doing the process of ecdysis, because with old exoskeleton, animal cannot grow larger in size.

98. Differentiate between ligament and tendon.

Ans:

Ligament	Tendon
This is a type of connective tissue which attach bone to bone and are slightly elastic.	This is also a type of connective tissue which attach muscles to bones and are non-elastic.

99. Elaborate locomotion in star fish.

Ans: Starfish moves with the help of tube feet. The tube feet are present on both sides of radial canal that extends upto the tip of arm. The tube feet extend when water is pumped into them, then they fix themselves by suction cup to some object. Later on they shorten and pull the body in this direction. In this way, starfish moves in any direction. Arms of the starfish also help in swimming.

100. How locomotion takes place in jelly fish?

Ans: Jelly fish has an umbrella like body called bell. First of all water enters in the bell then the bell contracts, the water is forced out like a jet and the animal moves forward. This movement is known as jet propulsion.

101 What is sleep movement? Also write an example.

Ans: Bean plants and some members of legume family lower their leaves in the evening and raise them in the morning. These are known as sleep movements. These sleeping movements are due to daily changes in the turger pressure in the pulvinus. When the turgor pressure on the lower side of pulvinus increases the leaves rise and become horizontal. When turgor pressure decrease on the lower side of pulvinus, the leaves lower and go to "Sleeping" position.

102. Discuss the structure and functions of collenchyma cells in plants.

Ans: Collenchyma cells have protoplasts and usually lack secondary walls. They have angular thickenings in their primary walls.

Collenchyma cells provide support to young herbaceous parts of the plant.

103. Name the bones of pectoral and pelvic girdle.

Ans: Pectoral girdle comprises:

Scapula, suprascapula and clavicle.

Pelvic girdle consists of two coxal bones. Each is formed by the fusion of three bones ilium, ischium and pubis.

104. Name the types of turgor movements.

Ans: Types of turgor movements are
1. Sleep movements
2. Rapid movement of leahplets

105. Write two adaptations in birds that help them for flight.

Ans: The skeleton of a bird is modified for flight. The most obvious adaptations are the bones with large air spaces which make them lighter.

The fore limbs evolved into wings with very strong pectoral muscles which pull the wings up and down. The sternum is modified to form keel. The keel is needed for the attachment of muscles.

106. Explain hinge joint.

Ans: The joint that allows the movements in two directions. These are at elbow and knee. At these joints, pair of the muscles are arranged in the same plane as that of joints. One end of each muscle, the origin is fixed to the immovable bone on one side of joint and the other end of muscles, the insertion is attached to the far side of the joint.

107. What is cleft palate?

Ans: Cleft palate, a condition in which palatine processes of maxilla and palatine fail to fuse. The persistent opening between the oral and nasal cavity interferes with sucking. It can lead to inhalation of food into the lungs causing aspiration pneumonia.

108. Define turgor pressure. Give its two functions.

Ans: In the stem function of support is shared among several types of cells. The living cells of epidermis, cortex and pith take part in water by osmosis. Thus an internal hydrostatic pressure called turgor pressure, keeps them rigid and resistant to bending.

The turgor pressure is extremely important to maintain the turgidity in plants.

109. Define nastic movement. What is thermonasty?

Ans: These are the non-directional response to external stimuli.

Themonasty: It is due to temperature. The flowers of tulip close at night because of rapid growth in the lower side by upward and inward bending of the petals.

110. What are synovial joints? Write the names of its two types.

Ans: These joints contain a cavity filled and are adapted to reduce friction between the moving joints. The joint is surrounded by a layer of connective tissue called "fibrous capsule" and their inner layer the synovial membrane. Some parts of capsule may be modified to form distinct ligament, holding the bones together based on structure and movement allowed, the synovial joints can be classified further into two major categories:

(i) Hinge joint

(ii) Ball and socket joint

111. Define photoactic and chemotactic movements.

Ans: **Photoactic Movement:**

It is a movement in response to stimulus of light. The movement may be towards the source of (positive) light or away from the source of light (negative). The best example of positive tactic movement is the passive movement of chloroplast due to cyclosis. This movement helps the chloroplast to absorb maximum light for CO_2 fixation.

Chemotactic movement:

The movement in response to stimulus of chemicals called chemotactic movement. The movements shown by sperms of liver-worts, mosses, ferns

towards archegonia in response to stimulus of nucleic acid released by the ovum is one such example.

112. Define unguligrades. Write its two examples.

Ans: These mammals walk on the tips of toes modified into hoop as dear, goat. It is the most swift type of locomotion.

113. How callus is formed?

Ans: After hematoma formation soft callus begins to form in 3-4 weeks. Capillaries grow into the hematoma and clear up the dabris. Fibroblasts and osteoblasts migrate into the fracture site and begin to construct bone.

114. How do plants respond to environmental stresses?

Ans: If plants are grown without light, they become extremely long and fail to form chlorophyll. They are said to etiolated.

Many plants take on a yellowish hue when they fail to form sufficient chlorophyll. This condition known as chlorosis is usually arises from short supplies of mineral nutrients in the soil.

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115. What are four major functions of skeletal system?

Ans: Functions of skeletal system are

i. Movement in the body

ii. Protection of inner parts of the body like brain, lungs, heart.

iii. Support and shape: it give support to soft parts of the body and provide shape to body.

iv. Blood cells like RBCs and WBCs are produced inside the bone marrow.

116. Give the composition of thin and thick filaments in skeletal muscles. / Give composition of filaments of skeletal muscles.

Ans::

Thick filaments	Thin filaments
The thick filaments are about 16 mm in thickness, are composed of myosin. Each myosin molecule has tail terminating in to two globular heads. Myosin tail consists of two long polypeptide chains coiled around each other.	Thin filaments are 7-8 mm thick and composed of actin molecules. The actin molecules are arranged in two chains twist around each other like twisted double strand of beads.

117. Differentiate between origin and insertion of muscles.

Ans: **Origin:** The end of the muscle which remains fixed when muscle contract is called origin.

Insertion: The end of the bone which moves the bone is called insertion point.

118. What are fibro cartilages?

Ans: It has matrix containing bundles of collagens fibre. It forms an external of ears and in epiglottis.

119. Give names of unpaired bones of skeletal muscles.

Ans: Frontal, occipital, ethmoid and sphenoid are unpaired bones of the cranium.

120. What are cartilaginous joints?

Ans: These joints allow little or no movement. Hyaline cartilage formed between growing bones. The bones held together by fiberous cartilage are found between vertebrae at the point where coxal bones meet in front of the pelvis.

121. How does shape of wings affect the type of flight in the birds?

Ans: The shape of the wings greatly influences the speed and type of flight which can be achieved. For example long narrow wings like those of gulls and sea birds are ideal for gliding into wind. While short broad wings like those of many garden birds are effective for slow flapping flight.

122. Define hydrostatic skeleton by giving example.

Ans: It is a fluid filled gastrovascular cavity or coelome can act as hydrostatic skeleton. It is present in those animals which lack hard skeléton.

123. How many ribs do not attach with sternum?

Ans: Two lower pairs of ribs called floating ribs do not attached with sternum.

124. What is osteomalacia and cleft palate?

Ans: **Osteomalcia:** (soft bone) includes a number of disorders in which the bones receive inadequate minerals. In this disease, calcium salts are not deposited and hence bones softens and weakens. Weight bearing bones of legs and pelvis bend and deform. The main symptom is the pain when weight is put on affected bones.

Cleft Palate: It is a condition in which palatine process of maxilla and palatine fail to fuse. The persistent opening between the oral and nasal cavity interferes with sucking. It can lead to inhalation of food in to the lungs causing aspiration pneumonia.

125. Compare photonasty and thermonasty.

Photonasty	Thermonasty
The main stimulus is the photoperiod. The flowers open and close due to light intensity.	It is due to temperature. The flowers of tulip close at night because of rapid growth at lower side by upward and inward bending.

LONG QUESTION'S OF CHAPTER-16 (SUPPORT & MOVEMENTS) BOARD PAPERS 2011-21

1. Explain sliding filament model of muscle contraction. (4-times)
2. Explain some major functions of skeletal system.
3. Explain ultra structure of mayofilaments of skeletal muscle fibers. (4-times)
4. Describe significance of secondary growth in plants.
5. Describe locomotion in Paramecium (2-times)
6. Explain the process of repairing of broken bones.
7. Write a note on hydrostatic skeleton.
8. Describe paratonic movements in plants. (3-times)
9. What are joints? Describe their types.
10. Write a note on mutation.
11. Describe locomotion in earthworm. (2-times)
12. Explain bones of human skull with diagram.
13. Define joints. How are they classified?

14. Give an account of autonomic movements in plants.
15. What are growth movements? Give its types.
18. What is endoskeleton? Describe bone and cartilage.
19. Elaborate some major functions of the skeletal system.
20. Write note on human appendicular skeleton.

OBJECTIVE (MCQ'S) OF CHAPTER-17 (COORDINATION & CONTROL) BOARD PAPERS 2011-21

Coordination in plants by chemical hormones

1. Etiolated plants grow without (3-times)
(a)Water (b) Light (c)O_2 (d) CO_2
2. The chlorosis condition in plants due to insufficient formation of.
(a)CO_2 (b)Water (c)O_2 (d) Chloropyll
3. Galls are growth on a plant that is introduced by:
(a)Ticks (b) Protozoans (c) Parasites (d) Fungi

Biological clock and circadian rhythms

4. In living things the behavior activities occur at regular intervals which are called:
(A) diurnal rhythms (B) Circannual (C) Biorhythms (D) Orcadian

Plant hormones

5. A plant hormone that promote cell enlargement behind the apical region of stem is: (3-times)
(a)Gibberellins (b) Auxin (c) Cytokinin (d) Abscisic acid
6. The hormone which promotes bolting of some rosette plants is known as:
(a)Auxins (b) Cytokinins (c) Ethene (d) Gibberellins
7. Which one of the following hormones promotes stomatal opening? (2-times)
(a)Auxin (b) Gibberellin (c) Cytokinin (d) Ethene
8. It is applied to rubber plant to stimulate flow of latex:
(a)Abscisic acid (b) Gibberellin (c) Ethene (d) Auxin
9. Abscisic acid can be sprayed on tree crops to regulate:
(a)Leaf drop (b) Shoot drop (c) Cone drop (d) Fruit drop
10. It delays ripening and improve storage life of fruits:
(a) Gibberellins (b)Cytokinins (c) Ethane (d)Abscisic acid
11. Abscisic acid promotes closing of stomata under conditions of stress
(a) Light (b) Water (c) Wind (d) Temperature
12. ____________ are indole acetic acid or its relevants.
(a) Auxins (b) Gibberellins (c) Cytokinins (d) Ethene
13. The plant hormone that inhibit the growth of lateral shoots
(a) Cytokinin (b) Gibberellin (c) Auxin (d) Ethene
14. Gibberellins are produced commercially from
(A) Plants (B) Fungi (C) Bacteria (D) made chemically
15. Plant growth hormone that promote bolting of some rosette plants is the:
(A) Gibberellins (B) Auxins (C) Cytokinins (D) Ethene
16. Which of the following promote fruit ripening (2-times)
a. Auxin b. Cytokinin c. Gibberellins d. Ethene

Working of sensory receptors with special reference to skin

17. Which of the following pairs is mismatched?
(a)Meissner corpuscles .... touch (b)Pacinian corpuscles .... Pressure
(c)Stretch receptor ... aortic articles (d)Nociceptors ... equilibrium
18. Nociceptors produced the sensation of:
(a) Touch (b)Warmth (c) Pressure (d) Pain
19. The sensation of pain is produced by:
(A) Chemoreceptors (B) Mechanoreceptors (C) Photoreceptors (D) Nociceptors

Neurons

20. The structure which responds by the impulse coming from the motor neurons are called:
(a) Receptors (b)Sensory neurons (c)Motor neurons (d)Effectors

21. Which neurons have long axon (2-times)
(a) Sensory (b)Motor (c) Associative (d) Cell body
22. The processes conducting impulses away from the cell body are called:
(A) Dendrites (B) Dendron (C) Nissl's granules (D) Axon
23. Nissl's granules are groups of
(a) Mesosomes (b) Lysosomes (c) Ribosomes (d) Chromosomes
24. Neuroglial cells provide the neuron with:
(A) Protection (B) Support (C) Locomotion (D) Nutrition

Reflex arc

25. Flow of impulse through the nervous system , involving receptors, neurons and effectors is called (3-times)
(a)Reflex action (b)Nerve impulse (c) Reflex arc (d)Simple reflex action

Nerve impulse

26. During non- conducting state the neuron membrane is permeable to efflux of:
(a)K^+ (b) Na^+ (c)Cl^- (d)Ca^{++}
27. The normal speed of nerve impulse in human is:
(a)100m/sec (b)110 m/sec (c)120 m/sec (d)130 m/sec
28. Resting membrane potential of a neuron is: (2-times)(2018)
(A) -50 mV (B) -60 mV (C) -70 mV (D) -80 mV
29. Cell membrane of neuron is slightly permeable to:
(A) K^+ (B) Na^+ (C) Ca^{++} (D) Fe^{++}

Synapse

30. The main transmitter for synapses that lie outside the central nervous system is:
(a)Adrenaline (b) Serotonin (c)Dopamine (d)Acetylcholine
31. Microscopic gap between the two neurons is called as
(a) Synapsis (b) Synapse (c) Collapse (d) Presynapse

Evolution of nervous system

32. Diffused type of nervous system is present in:
(a) Planaria (b)Earthworm (c) Hydra (d) Man
33. Beneath the cranium, the brain and spinal cord are projected by triple layer of:
(a)Meninges (b) Skin (c) Muscles (d) CSF

Brain

34. Hindbrain includes the medulla, pons and:
(a) Cerebrum (b) Cerebellum (c) Thalamus (d) Amygdala
35. The largest part of brain is (4-times)(2018)
(a) Cerebellum (b)Medulla (c) Thalamus (d) Cerebrum
36. In human, relay center is located in:
(a)Fore brain (b) Mid brain (c) Hind brain (d) Spinal card
37. All are related to medulla oblongata, except (2-times)
(a) Long term memory (b) Breathing rate (c) Heart beat rate (d) Blood pressure
38. Brain is protected by (3-times)
(a)Cranium (b) Skull (c) Orbits (d) Zygomatic bone
39. In humans mid brain is:
(A) Reduced (B) Enlarged (C) Swollen (D) Broken
40. The structure of human brain that control sleep wake cycle is:
(A) Amygdala (B) Hippocampus (C) Thalamus (D) Hypothalamus
41. In human beings memory is due to:
(A) Amygdala (B) Hypothalamus (C) Hippocampus (D) Thalamus

Peripheral nervous system

42. How many pairs of cranial nerves are in human being? (2-times)
(a) 8 pairs (b)10 pairs (c)12 pairs (d)14 pairs

43. A nerve is **(2-times)**
(a) Collection of neurons (b) Bundle of axons or dendrites
(c) Connection of dendrites and axons
(d) Bundle of axons and dendrites bounded by connective tissue

Epilepsy

44. The onset of epilepsy is usually before age of:
(A) 10 years (B) 20 years (C) 30 years (D) 40 years

45. Alzheimer's disease is
(a) Physical illness (b) Mental illness (c) Renal illness (d) Pulmonary illness

46. To cure Parkinson's disease dopamine producing cells could be grafted directly into the:
(A) Brain (B) Liver (C) Bone marrow (D) Blood

Chemical coordination

47. Vasopressin and oxytocin are **(3-times)**
(a) Protein (b) Amino acids and derivatives (c) Polypeptides (d) Steriods

Thyroid gland

48. Which one is not related to others?
(a) Cretinism (b) Oedema (c) Exophthalmic goiter (d) diabetes mellitus

Islets of langerhans (pancreas)

49. Glucagon causes an increase in level of blood: **(3-times)**
(a) Glucose (b) Sucrose (c) Lactose (d) Urea

50. Lack of insulin causes:
(A) Addison diseases (B) Ovulation (C) Diabetes Inspidus (D) Diabetes mellitus

51. Alpha cells of pancreas secrete:
(A) Glucagon (B) Insulin (C) Pancratic juice (D) Secretin

Gut

52. Gastrin is a hormone produced by **(2-times)**
(a) Adrenals (b) Pancreas (c) Gut (d) Liver

53. The hormone secreted by mucosa of the pyloric region of the stomach is:
(a) Gastrin (b) Secretin (c) Oestrogen (d) Progesterone

54. Gastrin stimulate the secretion of **(2-times)**
(a) Saliva (b) Intestinal juice (c) Gastric juice (d) Pancreatic juice

Imprinting

55. The simplest form of learning behavior is **(2-times)**
(a) Imprinting (b) Habituation (c) Insight learning (d) Latent learning

Habituation

56. The form of learning which involves a diminution of response to repeated stimuli: **(2-times)**
(a) Imprinting (b) Habituation (c) Latent learning (d) Insight learning

Insight learning

57. Kohler performed many experiments to show:
(a) Latent learning (b) Imprinting (c) Habituation (d) Insight learning

2018

58. The cytoplasmic process/fibres which carry impulse towards cell body is called:
(a) Dendron (b) Axon (c) Nissl's granules (d) Neurofibrils

59. The corpuscles situated quite deep in the body and are in form of encapsulated neurons ending, receive deep pressure stimulus are in the form of:
(a) Meissner's (b) Pacinian (c) Nissal's (d) White blood

60. Higher form of learning is the:
(a) Conditioned reflex type-I (b) Imprinting
(c) Insight learning (d) Latent learning

61. **Which hormone in male stimulates the production of testosterone:**
(a) TSH (b) FSH (c) LTH (d) ICSH

2019

62. **Testosterone is secreted by:**
(A) Sertoli cells (B) Interstitial cells (C) Germinal epithelium (D) Prostrate gland

63. **Structure of human brain that controls hunger is:**
(A) Amygdala (B) Hippocampus (C) Thalamus (D) Hypo-thalamus

64. **The receptor cells of planaria are sensitive to:**
(A) Light and pressure (B) Light, pressure and touch
(C) Touch pressure and chemicals (D) Light, pressure, touch and chemicals

65. **Pavlov performed experiments on dog to prove:**
(A) Conditional reflex I (B) Habituation (C) Conditional reflex II (D) Imprinting

66. **Flowering is induced in pineapple by growth hormone called:**
(A) Gibberellins (B) Abscisic acid (C) Cytokinins (D) Ethene

67. **Part of brain which controls breathing, heart rate and swallowing is:**
(A) Cerebrum (B) Medulla (C) Cerebellum (D) Mid brain

68. **Which one is not a part of limbic system?**
(A) thalamus (B) hypothalamus (C) amygdala (D) hippocampus

69. **During pregnancy, luterotropic hormone LTH and placental lactogen stimulate Mammary development in preparation for:**
(A) gestation (B) lactation (C) after birth (D) miscarriage

70. **Some times parthenocarpy is artificially induced for commercial purpose as in tomato, peppers by adding:**
(A) gibberellins (B) cytokinins (C) auxins (D) ethene

2021

71- **A selective weed killer is:**
(A) NAA (B) 2,4 D (C) Ethene (D) Abscic acid

72- **Leaf Abscission is promoted by:**
(A) Auxins (B) Gibberellins (C) Cytokinins (D) Abscisic Acid

73- **The Hormone which releases the lateral buds from apical dominance is:**
(A) Auxins (B) Gibberellins (C) Cytokinins (D) Abscisic Acid

74- **The part of brain, which play role in the formation of long term memory is:**
(A) Thalamus (B) Hippocampus (C) Amygdala (D) Pons

75- **Ethene promotes flowering in**
(A) Pine apple (B) Pears (C) Tomatoes (D) Rubber plant

76- **Excess thyroxine produces a condition called:**
(A) Cretinism (B) Dwarfism (C) Grave's disease (D) Cushing's disease

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
B	D	C	C	B	D	C	C	D	A	B	A	C	B	A	D
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
D	D	D	D	A	D	C	D	C	B	A	C	A	D	B	C
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
A	B	D	B	A	A	A	D	C	C	D	C	B	A	C	D
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
A	D	A	C	A	C	B	B	D	A	B	C	D	B	B	B
65	66	67	68	69	70	71	72	73	74	75	76				
A	D	B	A	B	C	B	D	C	B	A	C				

SHORT QUESTION'S AND ANSWER'S OF (COORDINATION & CONTROL) CHAPTER-17 BOARD PAPERS-2011-21

Coordination in plants by chemical hormones

1. What is chlorosis?

Ans: Yellowing of plant leaves due to deficiency of chlorophyll is called chlorosis. It may be due to defficency of nitrogen, magnesium or when plant is kept in dark for long time.

2. What are calluses?

Ans: These are the mass of undifferentiated cells produced in response to injury on plant body by mitotic cell division.

3. What is meant by division of labour?

Ans: Division of labour means a specific type of cells can perform a specific type of function. Like muscle cells contract and relax, glandular cells produce secretions, phloem can transport food.

4. Differentiate between etiolation and chlorosis.

Ans:

Etiolation	Chlorosis
When plant are grown in dark they become extra ordinary elongated or show abnormal height hence they are called etiolated plants and the process is called etiolation.	The yellowing of plant especially leaves due to deficiency of chlorophyll is called chlorosis.

5. What is chlorosis? How it is caused? Give its cause. **(3-times)(2018)**

Ans: Yellowing of plant leaves due to deficiency of chlorophyll is called chlorosis it is caused due to the deficiency of magnesium, nitrogen, or when plant is kept in dark for long time.

6. Differentiate between galls and callus.

Ans:

Callus	Galls
If plants are wound, they often develope masses of amorphous material with poor differentiation known as callus.	Galls are growth on plants that are induced by parasite and usually highly organized growth e.g the tumors induced by bacteria.

Biological clock and circadian rhythms

7. What is circannual rhythm? **(3-times)**

Ans: The rhythmic activities of organisms which are performed annually or after 365 days is called circannual rhythm.

8. What are biorhythms and diurnal rhythms? **(3-times)**

Ans: Biorhytyms are the biological activities of living organisms which are performed at regular intervals are called biorhytms.

Diurnal rhythms are the biological activities of organisms which are performed during one day or 24 hours.

9. Define biorhythms and gives its types. **(2-times)(2018)**

Ans: In living organisms the behavioral activities occur at regular intervals which are called biorhythms.

Its types are

i. Circannual rhythms (365 days) ii. Diurnal rhythms (24 hours)

Plant hormones

10. Write down the commercial applications of giberellins. OR Write down two commercial applications of gibberellins. (3-times)(2018)

Ans: Gibberellin is commercially used in brewing industry to produce alcohol by malting process of barley.

It delay and improve storage life of the banana and grape fruits.

It also promotes fruit setting.

11. Give two commercial applications of ethane. Give commercial application of ethane. (3-times)

Ans: it is used to increase the speed of latex flow in rubber plant, it is also used for artificial ripening of fruits and to induce flowering in pineapple.

12. Name the synthetic auxin used as selective weed killer. (2-times)

Ans: 2-4D (2,4 dichlorophenoxy acetic acid) is selective weed killer.

13. What are the commercial applications of cytokinins? Write commercial applications of cytokinins? (2-times)

Ans: It is used to delay age of fresh leaf crops and keep flowers fresh. It can also be used to break dormancy of seeds of some plants.

14. Give two functions of cytokinin hormone.

Ans: It inhibits primary root growth and promote opening of stomata.

15. Write four important roles of ethylene.

Ans: Ethene inhibits root growth.

Break dormancy of buds.

Promote fruit ripening.

Promote flowering in pineapple.

16. What are commercial applications of abscisic acid?

Ans: Abscisic acid can be sprayed on tree crops to regulate fruit drop at the end of the season. This removes the need for picking over a long time span.

17. Write down four functions of auxin. Write down two uses of auxin. (2-times)

Ans: Functions of auxin are

iii. Auxin promote cell elongation

ii. It promotes cell division in cambium

iii. It can induce parthenocarpy

iv. It promotes apical dominance

Receptors

18. Compare photoreceptors with chemoreceptors.

Ans:

Chemoreceptors	Photoreceptors
These are sensitive for chemical changes. These are for smell, taste and for blood carbon dioxide and oxygen, glucose, amino acids and fatty acids (receptors in hypothalamus)	Electromagnetic receptors or photoreceptors respond to stimuli of light for example in eyes, rods and cones

19. Mention the relative abundance and distribution of receptors in human skin.

Ans: The relative abundance of various types of receptors differs greatly for example pain receptors are nearly 27 times more abundant than cold receptors. The cold receptors are nearly 10 times more abundant than heat or temperature receptors. The receptors are not distributed evenly over the entire surface of the body. For example touch receptors are much more numerous in the finger than in the skin of the back.

20. Differentiate between chemoreceptors and mechanoreceptors. (2-times)

Ans:

Chemoreceptors	Mechanoreceptors
These are sensitive for chemical changes. These are for smell, taste and for blood carbon dioxide and oxygen, glucose, amino acids and fatty acids (receptors in hypothalamus)	These detect stimuli of touch, pressure, hearing and equilibrium.

Working of sensory receptors with special reference to skin

21. What are pacinian corpuscles? **(2-times)**

Ans: Pacinian corpuscles situated deep in the body. These are also encapsulated neuron endings and receive the deep pressure stimulus. Those located in the limbs probably form a basis for vibration sense.

22. What are meissner's corpuscles?

Ans: Meissner's corpuscles (encapsulated endings) which lie in papillae which extend into the ridges of the finger tips. The corpuscles consists of spiral and much twisted endings, each of which ends in knob. These are touch receptors.

Neurons

23. What are effectors? Give examples. / Define the term effectors. Write down two important effectors of humans. **(6-times)**

Ans: Effectors are the organs which show response after receiving message from the associative neurons via motor neurons. For example muscles and glands.

24. Define "Nissl's Granules. **(2-times)**

Ans: Nissl's granules which are groups of ribosomes associated with rough endoplasmic reticulum and golgi apparatus for protein synthesis, present in cell body of neuron.

25. What is neurogila? Give its role.

Ans: In higher animals half of the nervous system consists of neuroglia cells. It plays a vital role in the nutrition of neurons and their protection by myelin sheath.

26. Define receptors. Give their types.

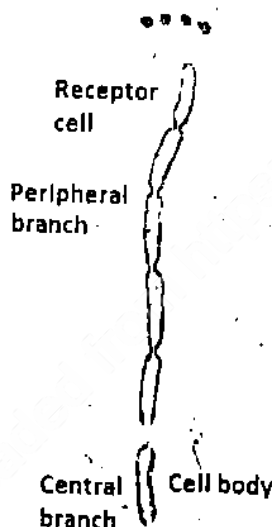
Ans: Receptors are the sensory organs which receive stimulus and transfer it to associative neurons via sensory neurons for further action e.g., eyes, ear, nose, skin and tongue.

27. Sketch and label sensory neuron.

Receptor cell

Peripheral branch

Central branch

Cell body

Sensory Neuron

28. **Differentiate between axons and dendrites.**

Ans:

Dendrite	Axon
It is cytoplasmic fiber of neuron which is smaller in size but many in number and conduct nerve impulse towards cell body.	It is cytoplasmic fiber of neuron which is very long in size and one in number and conduct nerve impulse away from cell body.

Reflex arc

29. **Differentiate between reflex arc and reflex action. / Define reflex arc and reflex action.** **(5-times)**

Ans:

Reflex arc	Reflex action
The path followed by the nerve impulse during the reflex action is called reflex arc.	Involuntary actions are called reflex action. This action is performed without the involvement of brain.

30. **Define reflex arc and give its components.** **(2-times)**

Ans: The path followed by the nerve impulse during the reflex action is called reflex arc. Its components are receptors, sensory neurons, inter neuron, motor neuron and effectors.

Nerve impulse

31. **What do you know about saltatory nerve?** **(2-times)**

Ans: In myelinated neurons the nerve impulse jump from one node to another node (node of Ranvier). It is called saltatory nerve impulse.

32. **What is meant by resting membrane potential?**

Ans: A typical neuron at rest is more positive outside than inside the cell membrane. This net difference in charge between the inner and outer surface of a non – conducting neuron is called resting membrane potential.

33. **Differentiate between nerve impulse and saltatory impulse.**

Ans:

Nerve impulse	Salutatory impulse
Nerve impulse is a wave of electrochemical changes which travels along the length of the neuron involving chemical reactions and movement of ions across the cell membrane.	In myelinated neurons the impulse jumps from node to node this is called saltatory impulse.

34. **What is sodium potassium pump?**

Ans: These are the special proteins which are present on the neuron membrane and act as pump to move the K^+ ions across the membrane during the transmission of nerve impulse.

35. **Differentiate between resting membrane potential and active membrane potential.** **(3-times)**

Ans:

Resting membrane potential	Active membrane potential
A typical neuron at rest is more positive outside than inside the cell membrane. This net difference in charge between the inner and outer surface of a non – conducting neuron is called resting membrane potential.	In active membrane potential inner membrane surface become more positive than outside. It is form of impulse. This change is so brief that only a portion of it is in active membrane potential.

Synapse

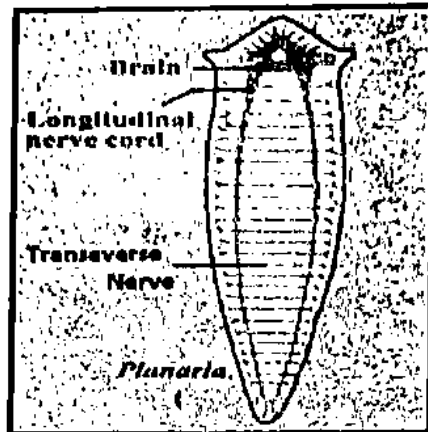
36. **What are neurotransmitters? Give its examples** **(4-times)**

Ans: Neurotransmitters are the chemicals which are secreted at neuron endings, which transfer nerve impulse from one neuron to another neuron e.g Acetylcholine, adrenaline, dopamine, serotonin.

37. Define synapse. / Define the term synapse. **(4-times)**

Ans: There are the microscopic gaps between the two neurons where neurotransmitters are secreted and nerve impulse is transferred from one neuron to next neuron.

Evolution of nervous system

Sketch nervous system of planeria.

Brain

38. How brain is protected with various covers?

Ans: Cranium protects the brain. Beneath the cranium brain is protected by triple layer of meninges. Between the meninges there is filled cerebrospinal fluid which act as shock absorber.

39. Give the name of structural components of limbic system. **(2-times)**

Ans: Limbic system includes hypothalamus, hippocampus and amygdala.

40. Name various structures that protect our brain.

Ans: Following are the structures which protect our brain

i. skull
ii. Meninges (tough membranes)
iii. Cerebrospinal fluid which act as shock absorber.

41. What is cerebrospinal fluid? Give its function.

Ans: Beneath the cranium, the brain and spinal cord are protected by triple layer of meninges. Between the layers of meninges the cerebrospinal fluid (CSF), similar in composition to blood plasma.

Its function is to bath the neurons of brain and spinal cord and it cushions against bumps and jolts.

Peripheral nervous system

42. Differentiate between CNS and PNS. **(2-times)**

Ans:

CNS	PNS
Central nervous system consists of brain and spinal cord.	Peripheral nervous system consists of nerves arising from brain (cranial nerves) and spinal cord (spinal nerves).

43. What do you know about parasympathetic nervous system?

Ans: A few cranial nerves including the vagus nerve together with the fibre from bottom portion of spinal cord form PNS. It promotes all the internal responses which are associated with the relaxed state i.e., contraction of pupil, promotes food digestion and retards heart beat.

44. Differentiate between nerves and ganglia.

Ans:

Nerve	Ganglion
The nerves are the bundles of axons or dendrites bounded by connective tissues.	The concentrated mass of cell bodies of neurons is called ganglion.

Autonomic nervous system

45. Compare sympathetic nervous system with parasympthetic nervous system.

Ans:

Parasympathetic nervous system	Sympthethic nervous system
A few cranial nerves including the vagus nerve together with the fibre from bottom portion of spinal cord form PNS. It promotes all the internal responses which are associated with the relaxed state i.e., contraction of pupil, promotes food digestion and retards heart beat.	Most ganglion fibers of the sympathetic nervous system arise from the middle portion of the spinal cord and almost terminate in ganglia that lie near the cord. This system is important during emergency situation and associated with fight or flight. This system accelerates the heart beat and dilates the pupil and inhibits the digestion of food etc.

46. Give effects of nicotine on blood vascular system and digestive system in man.

Ans: It increases the heart beat rate, blood pressure and digestive tract mobility. Nicotine may induce vomiting and diarrhoea and even may cause water retention relation by kidneys.

47. What is action of nicotine on coordination? **(2-times)**

Ans: Nicotine affects post synaptic membrane in CNS and PNS. It minimizes the action of acytylcholine on the nicotine receptors. So it is stimulant of nerve impulse. It increases the heart beat rate, blood pressure and digestive tract mobility. Nicotine may cause vomiting, diarrhoea and even may cause water retention relation by the kidneys.

Epilepsy

48. What is epilepsy?

Ans: It is one of the convulsive disorders of nerves which is characterized by abrupt transient symptoms of motor, sensory, psychic or autonomic nature, frequently associated with changes in consciousness.

Alzheimer's disease

49. Write a note on Alzheimer's disease.

Ans: It is characterized by decline in brain function. Its symptoms are similar to those of dememntia (memory loss). There is genetic predeposition to the disease in some people. So it runs in families.

Chemical coordination

50. Give two characteristics of hormones. **(2-times)(2018)**

Ans: Hormones are proteins in nature.

They help in the co-ordination of the organisms by activating the target cells of the body.

The pituitary gland

51. What are the functions of oxytocin hormones? **(4-times)**

Ans: It cause distention of cervix, its primary function is on smooth muscles, particularly on uterus during child birth and also cause milk ejection.

52. Write down the role of hypothalamus in chemical coordination. **(2-times)**

Ans: It is a part of fore brain. It is here that many of the sensory stimuli of nervous system are converted into hormonal responses. It is believed that oxytocin and ADH are produced in hypothalamus.

53. Which Hormones are secreted by posterior lobe of pituitary gland?

Ans: Antidiuretic hormone and oxytocin are secreted by the posterior lobe of pituitary gland.

54. What is the role of anti diuretic hormone (ADH)?

Ans: ADH secretion cause decrease in blood pressure, blood volume and osmotic pressure of the blood detected by osmoreceptors in the hypothalamus. It is mainly control the concentration of urine.

Thyroid gland

55. What is cretinism?

Ans: If congenitally thyroxin production is low, it may cause cretinism, where the individual fails to develop normally. These are small, have coarse scanty hairs, thick yellowish scaly skin and mentally retarded.

56. Define acromegaly. Give its causes.

Ans: Abnormal increase in size of appendages and other body parts due to excess release of thyroxin is called acromegaly.

Parathyroid gland

57. What are the functions of parathyroid glands? OR What are two functions of parathyroid gland? / What is the main function of parathyroid gland? (3-times)

Ans: Parathyroid gland produces paratharmone which control calcium level in the blood. Its over activity cause demineralization of bones while under activity cause muscular tetany.

58. How Ca^{++} concentration in human blood is regulated?

Ans: Calcium level in human is controlled by the parathomone. Low level of calcium ions in the blood stimulate parathyroid directly to increase the parathormone production whereas high level of calcium ions in the blood suppresses its release.

Islets of langerhans (pancreas)

59. Give the role of insulin and glucagon. (2-times)

Ans: Insulin controls the blood sugar level by different ways. It may be as

i. By converting glucose into glycogen
ii. By converting glucose into proteins or fats.
iii. By increasing its utilization in the cell
iv. By inhibiting the conversion of glycogen into glucose

Glucagon increases the blood sugar level. This is done by converting stored glycogen into glucose.

60. Name hormones secreted by Islets of langerhans and their role.

Ans: Islets of Langerhans produce Insuline and glucagon. They maintain blood glucose level.

Adrenal gland

61. What is cushing's disease? Give its symptoms.

Ans: In cushing's disease too much cortical hormones are produced. Symptoms include an excessive protein breakdown resulting muscular and bone weakness.

62. Name hormones released by adrenal gland. (2-times)

Ans: It produces adrenaline and nor adrenaline by adrenal medulla.
Aderenal cortex produces aldosterone and androgenic hormones.

Androgens

63. Give the functions of androgens.

Ans: In human males androgens cause the development of secondary male characteristics. In females its excess secretion may cause the development of male characters.

Gut

64. Discuss the role of two hormones produced by gut.

Ans: Gastrin produced from mucosa of pyloric region of stomach. It stimulates the production of gastric juice.

Secretin produced from intestinal mucosa and it stimulates the production of pancreatic juice.

65. Give role of human gut as endocrine tissue. / Differentiate between gastrin and secretin hormone. (2-times)

Ans: Human gut act as endocrine gland. Important hormones produced by gut are

Gastrin: This hormone is produced by mucosa of pyloric region of the stomach. It stimulates the production of gastric juice. It produced under the influence of protein in the food.

Secretin: It produced from the duodenum when the acidic food from the stomach touches its lining. Affect the pancreas to produce and secrete pancreatic juice and also affect rate of bile production in the liver.

Gonads:

66. What is leutinizing hormone (LH). Write its role. (2-times)

Ans: LH works with FSH to stimulate oestrogen secretion and rupture mature follicles to release ovum. It also causes leutinization of follicle after ovulation and along with prolactin maintains corpus leuteum.

Feedback mechanism

67. Define feedback mechanism. (3-times)

Ans: It is a type of interaction in which a controlling mechanism is itself controlled by the products of the reaction it is controlling.

Comparison of nervous and chemical coordination

68. Write four similarities of nervous and chemical coordination. / What are two nervous and chemical coordination. (2-times)

Ans: Similarities are as follow

i. Both system help in co-ordination.
ii. Both are homoeostatic in function.
iii. Both release chemical messenger in extracellular space of body.
iv. Both systems synthesize chemical messengers.

Innate behavior

69. Differentiate between kineses and taxes. (4-times)

Ans:

Kineses	Taxes
Kineses is a behavior in which an organism changes the speed of random movement which helps them to survive in the environment.	In contrast to kineses a taxis is a directed movement either towards or away from a stimulus.

Learning behavior (modification through experience)

70. Define latent learning.

Ans: It is the association of indifferent stimuli or situations without patent reward.

71. Enlist any four types of learning behavior. (2-times)

Ans: Four type of learning behavior are

i. Imprinting
ii. Habituation
iii. Insight learning
iv. Latent learning

Imprinting

72. Explain imprinting.

Ans: Young birds after hatching have a tendency to follow moving objects in their surroundings and show a brief period of sensitivity during which shape of an object can be imprinted with the result that the young birds follow them.

Habituation

73. Define habituation. Give its one example. (2-times)

Ans: It is the simplest form of learning and involves modification of behavior through decrease in response due to repeated stimuli e.g Rodents respond to alarm calls by others in their groups, if these calls are continued and no danger is confirmed, further calls may be ignored.

74. What is habituation. Give example. (3-times)

Ans: It is simplest form of learning and involves modification of behavior through a diminution of response to repeated stimuli.

Example: Rodents respond to alarm calls by others in their group, if these calls are continued and no danger is confirmed, further calls may be ignored.

75. What is reflex action?

Ans: Reflex action is a type of involuntary action. The direction of stimulus is from receptors to sensory neuron to associative neuron and then through motor neuron to the effectors.

76. Differentiate between thermoreceptors and and nociceptors.

Ans:

Thermoreceptors	Nociceptor
1. Types of neurons which show response to cold and warmth. 2. These are free nerve endings.	1. Types of neurons which produce the sensation of pain. 2. These are undifferentiated endings.

77. What are the functions of follicle stimulating hormones?

Ans: Follicle stimulating hormone in females stimulates follicle development and secretion of oestrogens from the ovaries; in males it stimulates development of the germinal epithelium of the testis and sperm production.

78. Differentiate between mechanoreceptors and thermoreceptors.

Ans:

Mechanoreceptors	Thermoreceptors
"The type of receptors which detect stimuli of touch, pressure, hearing and equilibrium are known as mechanoreceptors." e.g. Free nerve endings, expanded tips ending and stray endings.	These are free nerve endings. These show response to cold and warmth.

79. Define reflex arc.

Ans: Reflex arc is the path way of passage of impulse during a reflex action.

80. Define Acromaegaly. Give its causes.

Ans: If somatotrophin hormone produced in excess amount in adult age, it causes the abnormal development of hands, feet, jaws, etc. (Known as acromegaly).

81. What do you know about Gastrin?

Ans: Gastrin is the hormone produced by mucosa of the pyloric region of the stomach. It stimulates the secretion of gastric juice. It is produced under the influence of protein food in the stomach after it is partially digested.

82. What are chemoreceptors?

Ans: "Type of receptors which are for smell, taste and for blood, CO_2, oxygen, glucose, amino acids and fatty acids are termed as chemoreceptors." e.g receptors in the hypothalamus.

83. Define neurotransmitter. Give its two types.

Ans: "Neutrotransmitters are chemicals which are released at the axon ending of the neurons, at synapse."

Many different types of neurotransmitters are known. These are:

(i) Acetylcholine (ii) Dopamine

34. What is para-sympathetic nervous system?

Ans: A few cranial nerves including the vagus nerve together with the nerves from the bottom portion of spinal cord, form the parasysmpathetic nervous system.

It promotes all the internal responses which are associated with the relaxed state i.e. contraction of the pupils, promotes digestion of food, retards heart beat etc.

35. What is Parkinson's disease?

Ans: It is a nervous disorder characterized by involuntary tremors, diminished motor power and rigidity. The disease is believed to be caused by cell death in a brain area that produces dopamine. Onset of disease is usually in 50's and 60's.

86. What is neuroglia? Give its role.

Ans: The chief structural and functional units of the nervous system are neurons, but there are other cells, in higher animals and in humans called neuroglia, which make up as much half of the nervous system. Neuroglia play a vital role in the neutrition of neurons and their protection by myelin sheath.

87. Define Hormones. Enlist their chemical composition.

Ans: Hormones are organic compounds of varying structural complexity. They are poured directly and are transported to blood to respective target tissues." (Greek hormone is exciting, setting in motion).

Chemically hormones may be of following four types:

1- Proteins e.g. Insulin
2- Amino acids e.g thyroxine
3- Polypeptides e.g oxytoxin
4- Steroides e.g. testosterone

88. List the four types of hormones with examples.

Ans: Chemically hormones may be of following four types:

(i) Proteins (e.g Insulin and glucagon).
(ii) Amino acids and derivatives (e.g Thyroxine, epinephrine and norepinephrine).
(iii) Polypeptides (e.g Vasopressin or anti-diuretic hormone and oxytocin).
(iv) Steroids (e.g oestrogens, testosterone and cortisone.

89. How communication across the synapse occurs?

Ans: When an impulse reaches a synaptic knob, synaptic vesicle within fuse with the presynaptic membrane, causing the release of neurotransmitter molecules into the synaptic cleft. The neutrotransmitter molecules bind to the receptors, on the postsynaptic membrane, triggering an action potential in the postsynaptic neuron, by causing changes in its permeability to certain ions.

90. Write down two major functions of mid brain.

Ans: Mid brain contains auditory relay centre and centre that controls reflex movement of eyes.

Mid brain contain reticular formation, which is a relay centre connecting hind brain with the forebrain.

91. What are the abnormalities caused by the destruction of adrenal cortex?

Ans: The destruction of endrenal cortex, such as occurs in Addison's disease, will lead to general metabolic disturbance, in particular weakness of muscle action and loss of salts. Stress situations, such as cold, which would normally be overcome lead to collapse and death.

92. What is Feed Back Mechanism? Give an example.

Ans: It is a type of interaction in which a controlling mechanism is itself controlled by the products of reactions it is controlling.

The interaction between the pituitary and other endocrine glands, over which it exerts control, is an example of feedback mechanism and this mechanism is very common in living systems. Feedback in thyroid gland function for the release of thyroxin at the stimulus of low temperature in humans is an example of this.

93. How pancreas acts as both exocrine and endocrine gland?

Ans: Functioning as an exocrine glands, the pancreas excretes enzymes to break down the proteins, lipids, carbohydrates and nucleic acids in food. Functioning as an endocrine gland, the pancreas secretes the hormones insulin and glucagon to control blood sugar levels throughout the day.

94. Which hormones are secreted by posterior lob of pituitary gland?

Ans: Posterior lobe of pituitary gland secretes the following hormones:

1. Antidiuretic hormone (ADH) or vasopressin.
2. Oxytocin

95. Write down the functions of sympathetic nervous system.

Ans: The system is important during emergency situations and is associated with "fight or flight". This system accelerates the heart beat, dilates the pupil and inhibits the digestion of food etc.

96. **Define diurnal rhythms and circannual rhythms.**

Ans: Biorhythms may occur showing periodicity of about 24 – hours. These are called circadian (Latin circa = about, die – day) which means about one day, so they are also called diurnal rhythms.
If the biorhythms are of about 365 days, these rhythms in activity are circannual.

97. **Write two uses of 2, 4 dichloro phenoxy acetic acid.**

Ans: Inhibits sprouting of potatoes.
Prevents premature fruit drop (retards abscission)

98. **What do you know about Latent learning.**

Ans: Thorpe defined latent learning as the association of indifferent stimuli or situations without patent reward.
Suppose we put a rat in a maze as it wanders about and accidentally gets food. Did he learn anything before getting the food in the first experience. If we put the rat in the same maze again, it may directly reach the food. That means when the rat was wandering, it did learn something without even the incentive of any reward.

2021

99. **Draw the sketch of motor neuron.**

100. **What is epilepsy? Give test for proper diagnosis.**

Ans: It is the one of the convulsive disorders characterized by abrupt of transient symptoms of motor, sensory, psychic or autonomic nature, frequently associated with changes in consciousness.
Test: Electronencephlography is most important test in the study of epilepsy.

101. **How plant growth is affected by ethane?**

Ans: Ethane inhibits stem growth, especially under physiological stress. It also inhibits root growth.

102. **Write structural components of limbic system.**

Ans: Limbic system includes hypothalamus, amygdale and hippocampus.

103. **Write down the role of auxin and cytokinins in apical dominance.**

Ans: **Auxin** promotes apical dominance and inhibits the growth of lateral buds.
Cytokinin removes apical dominance and promote lateral bud growth.

104. **Define gibberellins. Give their two commercial applications.**

Ans: **Gibberellins** also a growth hormone and control many function along with auxin. It is produced commercially from fungal culture.

Commercial applications: GA promotes fruit setting for example in tangerine and pears and used for growing seedless grapes.

It is also used to delay ripening and improve storage life of banana and grapes

105. Differentiate between ganglion and nerve.

Ans:

Ganglion	Nerve
Ganglions are the concentrations of cell bodies of neuron.	The nerves are the bundles of axons or dendrites bounded by connective tissues.

106. Write down the symptoms of congenital deficiency and later in life deficiency of thyroxin.

Ans: Congenital deficiency of thyroxin causes cretinism, where the individual fails to develop normally. These are small, have coarse scanty hairs, thick yellowish scanty skin and mentally retarded. There is also failure to develop sexually. Deficiency later in life perhaps due to iodine deficiency in diet, produce a swelling of the neck (goiter) and lead to lying down of excess fat and weight is increased. This condition is known as myxoedema and it is characterized by puffiness of hand and skin, results.

107. Define nerve impulse.

Ans: **Nerve** impulse is a wave of electrochemical changes, which travel along the length of the neuron involving chemical reactions and movement of ions across the cell membrane.

108. Name any four neurotransmitters, associated with co-ordination.

Ans: Important neurotransmitters are acetylcholine, dopamine, serotonin, adrenaline, nor-epinephrine.

109. What is acetylcholine? Give its role.

Ans: Acetylcholine is the main neurotransmitter for synapses that lie outside the central nervous system.

110. Differentiate between photoreceptors and thermoreceptors.

Ans:

Photoreceptors	Thermoreceptors
Electromagnetic receptors), these respond to stimuli of light for example in eye, rods and cones.	These receptors show response to cold and warm temperature.

111. What are auxins? Give their at least two commercial applications.

Ans: Auxin is the major hormone chemically it is indole acetic acid. Auxin used commercially to prevent premature fruit drop (retard abscission)

Auxin used as selective weed killer.

112. Differentiate between stimulus and response.

Ans:

Stimulus	Response
Any change in the external or internal environment is called stimulus.	Action shown by the effectors (glands & muscles) by receiving message from associative neurons is called response.

113. Define kinesis with an example.

Ans: It is a behavior in which a organism changes the speed of random movements which help them to survive in the environment e.g., this type of behavior enables pillpugs to reach the moist area which is required for their life.

LONG QUESTION'S OF CHAPTER-17 (COORDINATION & CONTROL) BOARD PAPERS-2011-21

1. Explain posterior lob of pituitary gland as an endocrine gland. (2-times)
2. Give sensory receptors and their function in detail.
3. Describe transmission of nerve impulse through synapse. (2-times)
4. Compare nervous system of hydra and planaria.
5. Define nerve impulse. How it is transmitted from one neuron to another neuron.
6. Discuss the role and commercial application of auxins. (3-times)
7. What are biological clocks? How are they caused? Give their types.
8. Write brief note on conditioned reflex type I. (3-times)
9. What is synapse? How do neurotransmitters help in passage of nerve impulse from one neuron to another?
10. Nervous system of Planaria is better developed than hydra.
11. What are receptors? Describe various types of receptors found in humans.
12. Write a note on thyroid gland. (2-times)
13. Elaborate latent learning and insight learning.
14. Describe briefly the function of different parts of human brain. (2-times)
15. What are receptors? Classify and explain each class. (3-times)
16. What is reflex arc? Describe the flow of information through the nervous system. (2-times)

2016

17. What is resting membrane potential? How is it maintained?
18. Discuss working of sensory receptors with special reference to skin.
19. Describe the role of Pancreas as an endocrine gland.
20. Give detail of major factors which are involved in resting membrane potential.(2-times)
21. Sketch and label the nervous system of cockroach.
22. What are neurons? Give their types and functions.
23. Describe four different types of learning behaviour.
24. Write note on adrenal gland.

OBJECTIVE (MCQ'S) OF CHAPTER-18 REPRODUCTION BOARD PAPERS-2011-21

1. Reproduction is very important to the survival of: **(2-times)**
(A) Species (B) Individual (C) Population (D) Community

Reproduction in plants

2. Evolution of pollen tube is parallel to the evolution of **(3-times)**
(a)Gamete (b) Fruit (c) Seed (d)Pollen
3. In which of the following, sporophyte is completely depend upon the gametophyte? **(3-times)**
(a)Gymnosperms (b) Angiosperms (c) Bryophytes (d)Thallophytes
4. Vehicle for transport of male gamete in land plants is: **(2-times)**
(A) Water (B) Pollen grain (C) Wind (D) Pollen tube

Parthenocarpy

5. The process in which seeds are not found in banana is called: **(3-times)**
(a)See Dormancy (b) Fruit Ripening (c)Parthenocarpy (d)Photoperiodism
6. Which one is not parthenogenic fruit?
(a) Banana (b) Pineapple (c) Grape (d) Mango
7. Parthenocarpy is the development of fruit without
(a) Pollination (b) Germination (c) Fertillization (d) Hormones
8. Parthenocarpy is sometimes artificially induced in tomato, peppers etc. by adding
(a) Abscisic acid (b) Cytokinins (c) Auxins (d) Gibberellins
9. Fruit development without fertilization is ___________
(A) Dormancy (B) Climacteric (C) Parthenocarpy (D) Parthenogensis

Vernalization

10. The condition in which biennial and perennial plants are stimulated to flower by exposure to low temperature is called: **(3-times)**
(a) Photoperiodism (b) Florgenation (c) Chilling (d) Vernalization
11. The temperature more effective for vernalisation is:
(A) 4°C (B) 8°C (C) 12°C (D) 16°C

Seed dormancy

12. The special condition of rest, which enables an embryo to survive the long periods of unfavourable environmental conditions, is called: **(3-times)**
(a) Bud dormancy (b) Leaf dormancy (c)Stem dormancy (d) Seed dormancy

Fruit set and fruit ripening

13. Which hormones stimulates ripening of tomatoes and citrus fruits?
(a)Auxins (b)Ethene (c)Cytokinins (d)Gibberellines
14. Fruit ripening is often accompanied by a burst of respiratory activity called the: **(3-times)**
(a) Dimetric (b) Climax (c) Climactric (d) Trimetric
15. Germinating pollen grain is a rich source of: **(3-times)**
(a) Gibberellins (b) Auxins (c) Abscisic acid (d) Cytokinin
16. Developing seeds are a rich source of: **(3-times)**
(a)Auxins (b) Gibberellins (c) Cytokinins (d) All of these
17. Which one of the following is a type of asexual reproduction?
(a) Fertilization (b) Vernalization (c) Apomixes (d) Photoperiodism

Photoperiodism

18. *Hyoscyamus niger* in an example of:
(a)Long day plants (b) Short day plants (c)Day neutral plants (d)A & B

19. Which of the following pairs is correct? (2-times)
(a)red light .... Cell division (b)Blue light .... Cell elongation
(c)Blue light ... cell enlargement (d)Red light .... Cell elongation

20. Which of the following plant is day- neutral? (2-times)
(a)Henbane (b) Cocklebur (c)Cabbage (d)Tomato

21. A light sensitive pigment found in plant cell is called:
(a)Cytochrome (b) Phytochrome (c) Photochrome (d) Auxin

22. In nature, P_{730} to P_{660} conversion occurs in the:
(a) Day (b) Red light (c) Dark (d) Dawn

23. Identify the day neutral plant (2-times)
(a) Cabbage (b) Cotton (c) Tobacco (d) Cocklebur

24. Plant hormone florigen is produced in (3-times)(218)
(a) Flower (b) Root (c) stem (d) Leaves

25. Tomato and cucumber are example of:
(a) Short day plants (b) Long day plants (c) Day neutral plants (d) None

26. The long day plants produce flowers in the presence of photochrome:
(a) P_{660} (b) P_{700} (c) P_{730} (d) P_{600}

27. Germination of some seeds e.g. some lettuce varities are promoted by:
(a) Green light (b) Blue light (c) Red light (d) Violet light

28. Photoperiod affects flowering, when shoot meristems start producing: (2-times)(2018)
(A) Floral buds (B) Leaves (C) Lateral bud (D) Roots

29. The light which promotes germination of fern spores: (2-times)(2018)
(A) Green (B) White (C) Blue (D) Red

30. P_{660} a quiescent form is converted to active P_{730} by the absorption of:
(A) Red light (B) Blue light (C) Yellow light (D) Orange light

31. Effect of photoperiodism was first studied in 1920 by
(a) Garner (b) Allard (c) Garner and Allard (d) Charles Lyell

Reproduction in animals

32. In honey bee sperms are produced by (2-times)
(a)Meiosis (b) Mitosis (c) Parthenogenesis (d)Apomixis

33. Haploid Parthenogenesis is present in:
(a)Wasp (b) Bee (c) Aphid (d) Ants

34. During oogenesis, the total non-disjunction of chromosomes occur in:
(a)Queen bee (b) ants (c) Wasps (d) Aphids

35. Development of an egg into embryo without fertilization is called as:
(A) Parthenocarpy (B) Parthenogenesis (C) Meiosis (D) Fragmentation

36. Diploid parthenogensis occurs in:
(A) wasp (B) ant (C) aphid (D) bee

37. Which one is the method of sexual reproduction in the following? (2-times)
(a) Fission (b) Sporulation (c) Budding (d) Conjugation

38. Reptiles and birds are (3-times)
(a) Oviparous (b) Viviparous (c) Viviparity (d) Ovoviviparous

39. Ovoviviparity is shown by:
(a) Reptile (b) Bird (c) Duck bill platypus (d) Human

40. Oviparous animals:
(a) Lay eggs (b) Give birth to young (c) Give larva (d) Give pupa

41. The animals that lay shelled eggs to protect the developing embryo from harsh terrestrial conditions are called:
(A) Oviparous (B) Viviparous (C) Ovoviviparous (D) None

Male reproductive system

42. The Sac-like scrotum is present in **(2-times)**
(a)Ovary (b)Testis (c)Lung (d)Kidney
43. The hormone responsible for production of sperm cells and male secondary sexual characteristics during puberty is **(3-times)**
(a)Progesterone (b)Thyroxine (c)Testosterone (d)Estrogens
44. Which hormone in male stimulates the interstitial cells of the testes to secrete testosterone **(3-times)**
(a)TSH (b)FSH (c)ICSH (d)LH
45. The cells provide liquid medium for protection and nourishment to sperms:
(a) Placenta (b) Epididymis (c) Sertoli (d) Vas deferens
46. Between the seminiferous tubules are Interstitial cells, which secrete:
(a) Estrogen (b) Testosterone (c) Aldostrone (d) corticosteroid
47. Sertoli cells are cells of **(2-times)**
(A) Testes (B) Ovaries (C) Urethra (D) Bladder
48. Fluid secreted by sertoli cells provides liquid medium protection and nourishment to:
(A) Oocyte (B) Sperms (C) Polar body (D) Spermatids
49. The first convoluted part of vas – deference is called:
(A) Scrotum (B) Epididymis (C) Seminiferous Tubules (D) Ureter

Female reproductive system

50. Germ Cells in the ovary produce many:
(A) Spermatogonia (B) Zoospores (C) Zygospores (D) Oogonia
51. Second meiotic division in oocytes, until fertilization proceeds are far as:
(a) Prophase (b) Metaphase (c) Anaphase (d) Telophase
52. Oviduct opens into: **(2-times)**
(a) Uterus (b) Ureter (c) Ovary (d) Vagina

Female reproductive cycle

53. Corpus luteum, after it's development, starts secreting a hormone is called:
(a)Oestrogen (b)Testesterone (c)Progesterone (d)Oxytocin
54. In human female, the discharge of blood and cell debris is called:
(a)Ovulation (b) Abortion (c) Menstruation (d) Secretion
55. Lutenizing hormone induces:
(a) Flowering (b) Ovulation (c) Vernalization (d) Menopause
56. Decrease of FSH and increase of estrogen, causes the pituitary glands to secrete **(3-times)**
(a)Luteotropic hormone (b) Luteinizing hormone
(c) Vasopressin (d) Oxytocin
57. Discharge of egg from ovary is called:
(a) Ovulation (b) Oogenesis (c) Gametogenesis (d) Menstrual cycle
58. The end or complete stop of the menstrual cycle is called:
(A) Menopause (B) Emotional stress
(C) Malnourishment effect of cycle (D) Menstruationos
59. Ovulation is induced by
(a) FSH (b) LH (c) Estrogen (d) Progesterone

60. Towards the end of pregnancy, the reduction in progesterone level, stimulates pituitary gland to produce
(a) Oxytocin (b) Oestrogen (c) Androgen (d) Prolactin

61. Labour pains are induced by:
(A) Progesterone (B) Oxytocin (C) Estrogen (D) FSH

62. In human how many ova are usually discharged from the ovary at one time?
(A) 1 (B) 2 (C) 6 (D) 3

Birth process

63. Which hormone is also known as "Prolactin"?
(a)TSH (b)FSH (c)LH (d)LTH

64. The total gestation period in human female is usually about (4-times)
(a)280 days (b)270 days (c)265 days (d)260 days

65. From the beginning of the third month of pregnancy, the human embryo is referred to as: (2-times)
(a)Kid (b)Kitten (c)Baby (d)Foetus

66. The average loss of blood during and after birth is:
(a)250Cm^3 (b)300Cm^3 (c)350Cm^3 (d)400Cm^3

67. Human embryo remains enclosed in a sac called:
(a) Placenta (b) Chorionic sac (c) Amniotic sac (d) Egg shell

68. Human gestation period is of
(A) 280 days (B) 28 days (C) 3-7 days (D) 4 months

69. In human beings, most of the major organs of embryo are formed with in the:
(A) Ten Weeks (B) Six Weeks (C) Twelve Weeks (D) Fourteen Weeks

Gonorrhoa

70. Gonorrhoa is caused by:
(a) *Neisseria* (b) *T. Pallidum* (c) *Herpes simplex* (d) *Clostridium*

71. The disease caused by a gram positive bacterium Neisseria is called:
(A) Gonorrhea (B) Syphilis (C) Herpes (D) AIDS

Syphilis

72 Syphilis is caused by a spirochaete named as: (2-times)
(a) *Nisseria gonorrhoeae* (b) *Treponema pallidum*
(c) *Escheria coli* (d) *Hyphomicrobiam*

2018

73. Which one is Parthenogenic Fruit:
(a) Apple (b) Pineapple (c) Peach (d) Mango

74. An example of long-day plants is:
(a) Tomato (b) Cabbage (c) Corn (d) Soyabean

75. Rapid aging and low resistance to environmental stress and disease are limitations for:
(a) Fragmentation (b) Budding (c) Cloning (d) Regeneration

76. In spermatophytes, important step in land adaption is the evolution of:
(a) Seed coat (b) Pollen tube (c) Fruit (d) Flower

77. Soyabean is an example of, plants:
(a) Short day (b) Long day (c) Day neutral (d) Day independent

78. The inner soft wall of the human uterus is called:
(a) ectometrium (b) exometrium (c) endometrium (d) myometrium

79. Oestrus cycle, a reproductive cycle is found in all female except:
(a) cat (b) cow (c) human being (d) lion

2019

80. All of the following are day neutral plants EXCEPT:
(A) Pea (B) Wheat (C) Maize (D) Cotton

81. Lutenizing hormone in human female induces:
(A) Menstruation (B) Menopause (C) Oogenesis (D) Ovulation

82. Photoperiodism was first studied by Garner and Allard in:
(A) 1918 (B) 1920 (C) 1922 (D) 1924

83. The increase of level of estrogen stimulates secretion of:
(A) ACTH (B) FSH (C) Progesterone (D) LH

84. Developing Seeds are rich source of:
(A) Auxins (B) Cytokinins (C) Gibberellins (D) All these

85. Oviduct open into:
(A) Uterus (B) Cervix (C) vagina (D) Bladder

86. Low temperature treatment given to plants stimulates the production of vernalin which is actually the:
(A) Auxin (B) Gibberellins (C) Cytokinins (D) Ethene

2021

87- In honey bee the males are:
(A) Haploid (B) Diploid (C) Triploid (D) Polyploid

88- Estrogen produced by Ovary inhibits the secretion of
(A) FSH (B) LH (C) ADH (D) ATCH

89- Hormone that suppresses ovulation is
(A) Testosterone (B) Oestrogen (C) Progesterone (D) Gastrin

90- The yellowish glandular structure corpus luteum, starts secreting a hormone
(A) LH (B) FSH (C) Oestrogen (D) Progesterone

91- Placental lactogen in human females is secreted by:
(A) Pituitary gland (B) Ovary (C) Corpus luteum (D) Placenta

92- Which is a haploid cell?
(A) Spermatogonia (B) Primary spermatocyte
(C) Secondary spermatocyte (D) Germinal epithelium

93- Human sperms are formed in:
(A) Seminiferous tubules (B) Epididymis (C) Vas deferens (D) Ureter

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	C	C	D	C	D	C	C	C	D	A	D	B	C	B
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
D	C	A	D	D	B	C	B	D	C	C	C	A	D	A
31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
C	B	B	D	B	C	D	A	C	A	A	B	C	C	C
46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
B	A	B	B	D	B	A	C	C	B	A	A	A	B	A
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
B	A	C	A	D	C	C	A	C	A	A	B	B	D	C
76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
B	B	C	C	B	D	B	D	D	A	B	A	A	C	D
91	92	93												
D	C	A												

SHORT QUESTION'S AND ANSWER'S OF CHAPTER-18 (REPRODUCTION) BOARD PAPERS-2011-21

Introduction

1. Define reproduction. What is its significance?

Ans: Process in which living organism produced their new generation like to themselves is called reproduction.

It ensures the survival of species.

Reproduction in plants

2. Why seed plants are predominantly present all around as?

Ans: Seed plants are very common around us because these plants have many adaptations to survive on land like protected seeds, flowers and fruit formation. Seed dispersal plays an important role in distribution of flowering plants.

3. Differentiate between isomorphic and heteromorphic generations.

Isomorphic generation	Heteromorphic generation
If gametophyte and sporophyte generations are vegetatively and morphologically similar then they are called isomorphic generations.	If gametophyte and sporophyte generations are vegetatively and morphologically dissimilar then they are called heteromorphic generations.

Parthenocarpy

4. Define parthenocarpy with an example. / Define parthenocarpy. Write down the name of two fruits in which it occurs? (4-times)(2018)

Ans: Formation of fruit without fertilization is called parthenocarpy. For example seedless grapes and banana.

5. Differentiate between parthenocarpy and apomixes. (2-times)

Ans:

Apomixes	Parthenocarpy
In apomixes a diploid cell either from the nucellus or megaspore develops into a functional embryo in the absence of a male gamete. The rest of the ovule develops into seed and ovary into fruit.	Formation of fruit without fertilization is called parthenocarpy. For example seedless grapes and banana.

6. Define parthenocarpy. How it is artificially induced?

Ans: Formation of fruit without fertilization is called parthenocarpy. It is artificially can be induced by applying synthetic auxin (NAA).

7. How seedless fruits are formed?

Ans: Seedless fruits are also called parthenocapic fruits they formed without fertilization. It may be formed naturally as in banana and may formed artificially like seedless grapes.

Vernalization

8. Define vernalization. (3-times)(2018)

Ans: Chilling treatment given to the plant seeds before sowing is called vernalization.

9. Define vernalisation. Give its one importance. (4-times)

Ans: Chilling treatment given to seeds before sowing is called vernalization.

Its importance is as follows:

i. It ensures that all the members of a species flower at the same time

ii. It also synchronize the reproductive behavior of the plant with their environment.

10. Distinguish between vernalization and seed dormancy.

Ans

vernalization	Dormancy
Vernalization is the chilling treatment given to seed before sowing is called vernalization.	Dormancy is special Condition of rest, which enables an embryo to survive the unfavorable environmental conditions.

Seed dormancy

11. Define seed dormancy. Write its signifance. Give its importance. (5-times)(2018)

Ans: It is special condition of rest, which enables an embryo to survive the unfavorable environmental conditions.

It's importance is that during this period of rest the embryo ceases its growth. This is of great survival importance to the plant in that it prevents the dormant seeds from germinating in response to condition such as long spell of warmth in winter.

12. What is seed dormancy? (2-times)

Ans: It is the special condition of rest, which enables an embryo to survive the long period of unfavorable environmental conditions such as water shortage or low temperature.

Fruit set and fruit ripening

13. What is Apomixes? (5-times)(2018) OR What is meant by apomixes? (2-times)(2018)

Ans: In flowering plants one form of parthenogenesis is apomixes. In apomixes a diploid cell either from the nucellus or megaspore develops into a functional embryo in the absence of a male gamete. The rest of the ovule develops into seed and ovary into fruit.

14. Apomixes is a form of parthenogenesis. Discuss

Ans: In apomixes a diploid cell either from the nucellus or megaspore develops into a functional embryo in the absence of a male gamete. The rest of the ovule develops into seed and ovary into fruit.

15. Define fruit.

Ans: Ripened ovary is called fruit. After the fertilization the cells of ovary wall starts to divide and it develops into complete fruit.

16. Define Fruit set. (2-times)

Ans: Retention of the ovary which becomes fruit after the fertilization. Or it is the process in which ovary after fertilization starts to develop in to fruit is called fruit set.

Photoperiodism

17. Give two examples of short day plants. (3-times)

Ans: Tobacco, strawberry, soybean are short day plants.

18. Differentiate between short day plant and long day plants with examples.

Ans:

Short day plant	Long day plants
Short day plants flower when the days are short and nights are long e.g., tobacco, soybean.	Long day plant produce flowers when days are long and nights are short e.g., cabbage, spring wheat.

19. Give importance of photoperiodism in plants.

Ans: Photoperiodism plays an important role in flowering of plants in long and short day plants.

20. Define photoperiodism. (2-times)

Ans: Photo means light; periodism for duration (light duration).Response of a plant to 24 hours/day night cycle is photoperiodism.

21. What are phytochromes? (2-times)

Ans: Phytochromes are blue light sensitive proteins found in plants. They exist in two forms i.e., P_{660} and P_{730}. They play an important role in photoperiodism

22. What is the role of P_{730} phytochrome in flowering?

Ans: P_{730} induce flowering in long day plant while inhibit flowering in short day plants.

23. Define phytochromes and give its types.

Ans: Phytochromes are blue light sensitive proteins which receives the stimulus for flowering. They are of two type i.e., P_{660} or red phytochrome and P_{730} or far red phytochrome.

Reproduction in animals

24. What is diploid parthenogenesis? / What do you know about diploid parthenogenesis? (2-times)

Ans: In diploid parthenogenesis a diploid egg is formed due to non disjunction of chromosomes, they retain their diploid number of chromosomes; diploid egg then develops in to young female.

25. State two methods of asexual reproduction in animals.

Ans: **Binary fission** is a method of asexual reproduction in which animals like amoeba. During binary fission nucleus elongates and then divides into two nuclei, at the same time cytoplasm divides and two daughter cells are formed.

Regeneration is another method of asexual reproduction in which missing part of the body which is separated from the main body part develops into a complete organism.

26. Define haploid parthenogenesis. (3-times)

Ans: In the honey bees male develops without fertilization of egg. The queen bee carrying male gametes from the male has the ability to lay eggs that have not been fertilized. The sperms she receives from a drone bee are stored in a pouch closed by a valve. If these eggs are not fertilized then they develops in to haploid offspring. It is called haploid parthenogenesis.

27. Enlist methods of asexual reproduction. (2-times)

Ans: Types of asexual reproduction are :-

a. Budding
b. Parthenogenesis
c. Cloning
d. Tissue culture
e. Apomixes
f. Sporulation
g. Vegetative propagation
h. Artificial propagation

Tissue culture and cloning

28. Describe the process of cloning.

Ans: In animals especially vertebrate animals, a nucleus from the somatic cell is removed and introduced into an egg cell, whose nucleus has been destroyed by using UV light. The egg with transplanted diploid somatic cell nucleus develops into an organism, genetically identical to the parent who has contributed the nucleus.

29. What is tissue culture? .Explain. (2-times)

Ans: Growth of plant under aseptic conditions in culture medium is called tissue culture. In this technique tissue cut from the plant could be stimulated by the addition of nutrients, cytokinin, auxin, these cell show continued growth and differentiated in to a new plant.

30. Differentiate between tissue culture and cloning.

Tissue culture	Cloning
It is the growth of a tissue or plant in an artificial growth culture medium under aseptic conditions.	It is asexual reproduction in which genetically identical organisms are produced from a single species.

31. What are advantages of cloning?

Ans: Cloning has the advantage that all the offspring behave similarly.

- All the members of a clone have similar feature like their parent.

Good or desired characters can be transferred to next generation without any alteration.

32. Give two disadvantages of cloning. **(3-times)**

Ans: The entire organism produced by cloning are identical to each other and no genetic variability is produced.

All the organism will not show any resistant to disease if it outbreaks and all the generation will be died.

Identical twins

33. Differentiate between Identical twins and triplets. **(3-times)**

Ans:

Identical twins	Identical Triplets
If new born organisms are the product of mitosis and they have same genetic makeup, they are called identical twins. They are produced mitotically (Asexually).	In some cases, more than one egg are produced by the female and all eggs are independently fertilized forming two or more zygote. These zygotes develop into new offspring, but with different genetic combination. Such twins or triplets are called fraternal twins or triplets. They are produced sexually.

Sexual reproduction in animals

34. Differentiate between oviparous and viviparous. **(6-times)**

Ans:

Oviparous	Viviparous
In terrestrial environment fertilization is internal. This may lead to external development as in reptiles and words. They lay shelled eggs to protect the developing embryo from harsh terrestrial conditions. Such animals are called oviparous.	In mammals, internal fertilization leads to internal development and development of embryo is accomplished inside the female body, which gives birth to young one-such animals are called viviparous.

35. What are Ovoviviparous?

Ans: In some animals like duck bill platypus internal fertilization leads to internal development of the young ones in a shelled egg and when development is completed shelled egg is laid which hatches the offspring, such animals are called ovaviviparous.

Reproduction in man

36. What is difference between oogenesis and spermetogenesis in humans?

Ans:

Oogenesis	Spermatogenesis
In oogenesis, primary oocytes divide meiotically in to secondary oocytes and first polar body. Second meiotic division in the oocytes proceeds as far as metaphase but is not complete until the oocyte is fertilized by the sperm.	During spermatogenesis primary spermatocytes under go meiotic division to form four secondary spermatocytes and spermatids which then differentiated into four mature sperms.

Male reproductive system

37. Give the function of interstitial cells of testis **(4-times)**

Ans: Interstitial cells produce testosterone. This hormone is essential for the successful production of sperms.

38 What are functions of sertoli cells? **(3-times)**

Ans: Fluid secreted by sertoli cells provides liquid medium, protection and nourishment to sperms while they are in tubules.

39. Name various parts of male reproductive system in male. **(2-times)**

Ans: Testes, penis, Vas defference, epididymus

Female reproductive cycle

40. What is Follicle atresia? **(5-times)(2018)**

Ans: FSH stimulates the formation of several follicles. Only one of these follicles continues to grow with its primary oocytes while rest breakdown by a degenerative process called follicle atresia.

41. What is menopause? At which age it starts. **(3-times)**

Ans: The end or complete stop of menstrual cycle is called menopause. It starts at the age of 45 to 50 years.

42. Define "Ovulation". **(2-times)**

Ans: Discharge of ovum from the ovary is called ovulation.

43. Give the role of oxytocin.

Ans: Oxytocin induces the labour pain. It also causes contraction of uterus wall and milk ejection after child birth.

44. How oestrous cycle different from menstrual cycle? /Differentiate between oestrous cycle and menstrual cycle? **(2-times)**

Ans:

oestrous cycle	Menstrual cycle
Oestrous cycle is a reproductive cycle found in all female mammals except human female. In this cycle, the estrogen production prepares the uterus for conception partly and also follicle develops ova. At this stage female needs a physical stimulus of mating for ovulation. She exhibits a desire for mating or is said to be on heat.	In human females the periodic reproductive cycle is completed in approximately 28 days and involves changes in the structure and function of the whole reproductive system. It is called menstrual cycle.

45. What is corpus luteum? Give its function. **(2-times)**

Ans: The follicle cells after release of the egg are modified to form a special structure called corpus leuteum. It produces progesterone.

46. What is oestrous cycle? **(2-times)**

Ans: Oestrous cycle is a reproductive cycle found in all female mammals except human female. In this cycle, the estrogen production prepares the uterus for conception partly and also follicle develops ova. At this stage female needs a physical stimulus of mating for ovulation. She exhibits a desire for mating or is said to be on heat.

47. Define terms menstruation and menopause.

Ans: **Menstrual cycle**

In human females the periodic reproductive cycle is completed in approximately 28 days and involves changes in the structure and function of the whole reproductive system. It is called menstrual cycle.

Menopause

The end or Complete stop of menstrual cycle is called menopause.

48. What is role of progesterone in pregnancy?

Ans: Progesterone hormone develops the endometrium and makes it receptive for the implantation of the zygote. It also maintains pregnancy.

49. What is menopause?

Ans: The end or complete stop of menstrual cycle is called menopause. After menopause female can't produce any more ovum or egg & can't give birth to any child.

Birth process

50. What is after birth? OR What is meant by after birth? **(4-times)**

Ans: Within 10 to 45 minutes after birth uterus contracts and separate the placenta from the wall of uterus and placenta then pass out through vagina. This is called after birth.

51. Name the hormones that stimulate mammary glands for lactation.

Ans: Leutotropic hormone (LTH) and placental lactogen both stimulate mammary glands to produce milk.

52. What is labour pain?

Ans: At the time of birth, the reduction of progesterone level stimulates pituitary gland to produce oxytocin. This induces labour pain or contraction of the uterus wall.

53. Differentiate between lactation and gestation. (3-times)

Ans:

Lactation	Gestation
Lactation means discharge or production of milk from the mammary gland after child birth	Gestation is the total time period of pregnancy is called gestation. In human gestation period is of nine months.

54. Name the hormones secreted by placenta.

Ans: Placental lectogen and progestron is secreted by the placenta.

55. Define placenta. Give its function.

Ans: A placenta is established between the uterine and foetal tissues for the exchange of oxygens, carbondioxide, waste, nutrients and other materials. Once the placenta is established, it starts secreting the progesterone hormone which maintains the pregnancy.

Test tube babies

56. What are test tube babies? Discuss it. / Define test tube babies. (5-times)

Ans: Parental sperms and ovum is fertilized in vitro, (outside the female body) and then zygote is implanted back into mother uterus, placenta established and remaining development takes place in the body of the mother leading to normal birth.

Sexually transmitted diseases

57. For which the abbreviation of STD is used?

Ans: This abbreviation stands for sexually transmitted diseases.

Gonorrhoea

58. Write about the Gonorrhoea disease. / Explain Gonorrhoea. (4-times)

Ans: It is caused by gram positive bacteria *Neisseria gonorrhoeae* mainly affecting the mucous membrane of urinogenital tract. New born infants may acquire serious eye infection if they pass through the infected birth canal. It is highly contagious through the sexual contact.

Syphilis

59. Write about the disease Syphilis? OR Give causes and symptoms of syphilis? (2-times)

Ans: It is caused by a spirochete, *Treponema pallidum*. It damages the reproductive organs, eyes, bones, joints, CNS, heart and skin. Sexual contact is major source of its spread.

Genital Herpes

60. What is genital herpes? / What is genital herpes and its cause? Write down few words on genital herpes. (6-times)

Ans: It is caused by herpes simplex type 2 virus, most frequently transmitted by sexual contact causing infection of the genitalia. It produces genital sorness and ulcers in the infected areas. In infected pregnant women, virus can transmitted to infant during birth, causing damage to eyes and CNS of the infant.

61. Name two sexually transmitted diseases and their control.

Ans: Genital herpes and AIDS. These sexually transmitted diseases can be controlled by avoiding sexual contact with affected person and adopting the hygienic conditions and also by taking medical treatment.

62. Define AIDS.

Ans: AIDS: It is caused by AIDS virus (acquired immune deficiency virus) mainly

destroy the WBCs (lymphocytes) so immune system becomes weak. It is also transmitted from infected person through sexual contact.

2018

63. Define Photoperiodism.

Ans: Response of a plant to the relative length of day and night with respect to flowering is known as photoperiodism.

64. How implantation differes from gestation?

Ans:

Implantation	Gestation
Implantation is when the new human created at fertilization implants in the uterus. The newly created offspring, technically referred to as a blastocyst, travels to the uterus through the fallopian tube and implants in the wall of the uterus.	Gestation means carrying the embryo inside the felmale's uterus. It is the time period from conception to birth of the child.

65. What is menopause? Which factors affect reproductive cycle in female?

Ans: The end or complete stop of the menstrual cycle is called menopause, after which the female stops producing the ova. Malnourishment and emotional stresses effect the female reproductive cycle which may be disturbed. The cycle is not completed in its normal 28 days.

66. Differentiate the internal and external fertilizations.

Ans:

External Fertilizations	Internal Fertilizations
"Fertilization which occurs outside the body is known as external fertilization." It occurs in aquatic environment where male gametes can swin towards female gametes in water medium.	"Fertilization which occurs inside the body of organisms is known as internal fertilization." Sperms are lodged in the female body where fertilization occurs.

67. What is Gonorrhoa and who caused it?

Ans: It is caused by a gram positive bacterium *Neisseria gonorrhoeae*, mainly affecting the mucous membrane of urinogenital tract. New born infants may acquire serious eye infections if they pass through the infected birth canal. It is highly contagious through sexual contacts.

68. What is vernalization?

Ans: Biennials and perennials plants are stimulated to flower by exposure to low temperature. This is called vernalization. Duration of low temperature (chilling) treatment required varies from four days to three months. Temperature around 4^0C is found to be very effective.

69. What is diplohaplontic life cycle? Give its types. / Define diplohaplontic life cycle in plants. (2-times)

Ans: In sexual reproduction, plants have diplohaplontic life cycle with alternating diploid sporophyte and haploid gametophyte generations. Its types are isomorphic generations and heteromorphic generations.

2019

70. Define vernalisation. Which parts of plants received its effects?

Ans: Binnials and perenanial plants are stimulated from flowers by exposure to low temperature. This is called vernalization. The low temperature stimules is received by the shoot apex of a mature stem or embryo of the seed.

71. Explain the role of gonadotropins in human female.

Ans: The events of the menstrual cycle involve the ovaries and the uterus and these are regulated by pituitary gonadeotropins.

e.g. 1. Follicle stimulating hormone (FSH) stimulates the development of several primary follicles.

2. Luteinizing hormone (LH) induces ovulation.

3. Prolactin (Luteotrophic hormone LTH) stimulate mammry development in preparation for lactation.

72. Write down the mechanism of pollen tube evolution in spermatophytes.

Ans: Evolution of pollen tube is an important step in land adaptation by the spermatophytes.

Pollen tube acts as vehicle for male gametes for their safe transport to female gametes for their ovule hostile land environment. Evolution of pollen tube is parallel to the evolution of seed and is a tool of success for seed plants.

73. Write down the name of interstitial hormone. What are its functions?

Ans: Between the seminiferous tubules are interstitial cells which secrete testosterone. This hormone is essential for the successful production of sperms, and also controls the development of male secondary sexual characteristics during puberty.

74. Draw Graphic representation of Life Cycle of Bryophytes.

Ans:

Haploid spores(n)
Thallus(n) (haploid gametophyte generation)
Spore mother cells (2n)
Female organs archegonia (n)
Male organs antheridia (n)
Sporogonium (2n) diploid sporophyte generation
Oospheres (n)
Motile antherozoids(n)
Zygote (2n)
Swim in surface moisture to oospheres attracted by chemosecretions (chemotaxis)
Fertilization in archegonium

(a)

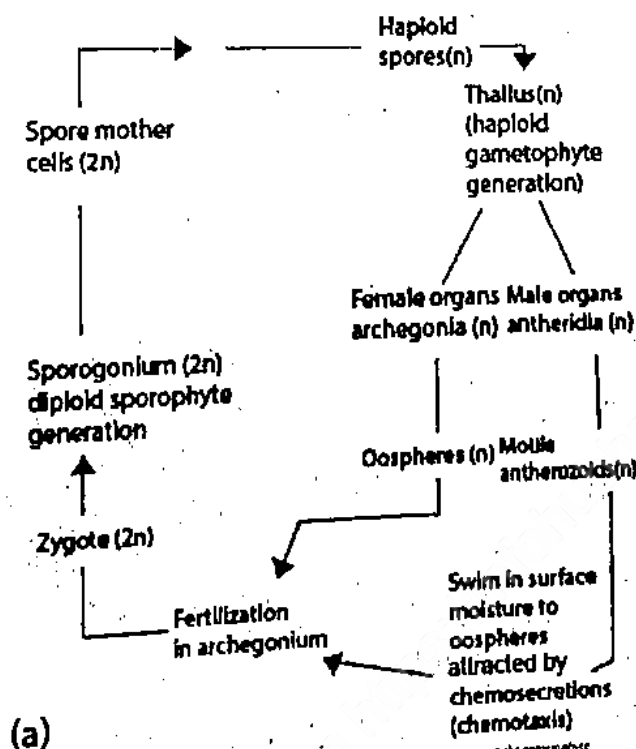



Fig 18.1 (a) Bryophyte life cycle. Note that the sporophyte is completely dependent upon the gametophyte

75: How a Seed is formed?

Ans: The formation of the seed is part of the process of reproduction in seed plants, the spermatophytes, including the gymnosperm and angiosperm plants. Seeds are the product of the ripened ovule, after fertilization by pollen and some growth within the mother plant.

76. What is ovoviviparity? Give its example.

Ans: In some mammals like duckbill platypus and spiny ant – eater internal fertilization leads to internal development of young. one in a shelled egg and when

development is completed. Shelled egg is laid which hatches of offspring. This is called ovoviviparous condition.

77. Define asexual and sexual reproduction.

Ans: Asexual reproduction requires only a single parental organism which gives rise to offspring by mitotic cell division, during which the total chromosomes content of the cell is exactly replicated and passed on to daughter cells, so that the offsprings are genetically identical to the parent.

Sexual reproduction usually involves two parents. A fertilized egg is produced through the union of meiotically produced specialized sex cells (egg and sperm) from each parents."

78. What do you know about apomixis?

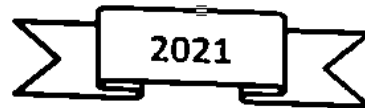
Ans: In flowering plants, one form of parthenogenesis is called apomixis. In this a diploid cell of the ovule, either from the nucellus us or megaspore, develops into a functional embryo in the absence of a male gamete. The rest of the ovule develops into the seed and the ovary into the fruit.

79. Write down the function of ACTH released from fetal pituitary.

Ans: The ACTH released from fetel pituitary stimulates the fetal adrenal gland to release corticosteroids which cross the placental barrier and enter the maternal blood circulation causing a decrease in progesterone production.

80. What are viviparous? Give an example.

Ans: In mammals, internal fertilization leads to the internal development of embryo is accomplished inside the female body, which gives birth to young one – such animals are called viviparous.

For example: Humans.

81. What is the significance of evolution of pollen tube in spermatophytes? / Write a note pollen tube

Ans: Evolution of pollen tube is an important step in land adaptation by the spermatophytes. Pollen tube acts as vehicle for male gametes for their safe transport to female gamete in ovule in hostile land environment. Evolution of pollen tube is parallel to the evolution of seed and is a tool of success for seed plants.

82. Site the rout of sperms from testis to outside in man.

Ans: The rout of sperms from testis to outside in man is as follow

From Seminiferous tubules then it foes to vas deference next is epididymis then sperm moves to urinogenital duct and are discharged out.

83. Define menopause and ovulation.

Ans:

Ovulation	Menopause
Discharge of ovum from the ovary is called ovulation.	The end or complete stop of menstrual cycle is called menopause.

84. What is climatric?

Ans: Fruit ripening is often accompanied by a burst of respiratory activity called climatric. This is associated with the ethane production which helps in ripening of fruits.

85. Compare haploid parthenogenesis with diploid parthenogenesis with example.

Ans:

Haploid parthenogenesis	Diploid parthenogenesis
In the honey bees male develops without fertilization of egg. The queen bee carrying male gametes from the male has the ability to lay eggs that have not been fertilized. The sperms she receives from a drone bee are stored in a pouch closed by a valve. If these eggs are not fertilized then they develops in to haploid offspring. It is called haploid parthenogenesis.	In some cases e.g., aphids diploid parthenogenesis may occur, in which the egg producing cells of the female undergo a modified form of meiosis in involving total non disjunction of chromosomes, they retain the diploid number of chromosomes. Diploid egg develops in to young female.

86. Give the mechanism of in-vitro fertilization.

Ans: Parental sperm and ovum is fertilized in- vitro (outside) the female body and then zygote us implanted back in to the mother uterus, placenta establishes and reaming development takes place in the body of the mother leading to normal birth.

87. Define parthenogenesis and seed dormancy.

Ans:

Parthenogenesis	Seed Dormancy
It is define as the development of an egg without fertilization, ants, bees and wasps are good example.	It is the special condition of rest, which enables an embryo survive the long period of unfavourable environmental conditions such as water shortage or low temperature.

88. What are identical twins?

Ans: If new born organisms are the product of mitosis and they have same genetic makeup, they are called identical twins.

LONG QUESTION'S OF CHAPTER-18 (REPRODUCTION) BOARD PAPERS-2011-21

1. Discuss the role of hormones secreted by ovary.
2. Write a note on sexually transmitted disease in human. (2-times)
3. Write down male reproductive system in humans. (4-times)
4. What is the role of phytochrome in flowering?
5. Describe various method of sexual reproduction in animals.
6. Describe human female menstrual cycle. (2-times)
7. What is reproduction? Explain about the cloning.
8. Discuss the effect of quality of light on photoperiodism.
9. Elaborate the child birth in humans. (4-times)
10. Compare asexual reproduction with sexual reproduction.
11. What is parthenogenesis? Describe its types. (3-times)
12. What is apomixes?

2016

13 Define photoperiodism. Give classification of plants according to photoperiodic requirements for flowering.

14 Discuss male reproductive system of human being.

15 Write a note on test tube babies and identical twins.

OBJECTIVE (MCQ'S) OF CHAPTER-19 (GROWTH & DEVELOPMENT) BOARD PAPERS-2011-21

Growth and development in plants

1. **Apical meristems are present in** **(2-times)**

(a)Shoot and root tips (b) Vascular cambium (c)Corck ambium (d) Stem nodes

Types of Growth

2. **Primary growth in plants Is caused by:**

(A) Apical meristem (B) Lateral meristem (C) Intercalary meristem (D) Rib meristem

Conditions of Growth

3. **For maximum Growth of plants, the optimum temperature is** **(2-times)**

(a) 15 - 20^0 C (b)20 - 25^0 C (c)25 - 30^0 C (d)30 - 35^0C

4. **Which light favours elongation of cell?**

(a)Blue (b) Ultra violet (c) Violet (d) Red

5. **The light that enhances cell division but retard cell enlargement:**

(a) Blue light (b)Red light (c) Green light (d)Yellow light

Differentiation (In plants)

6. **How many folds, cell volume, increases during elongation due to uptake of water:** **(4-times)**

(a) 120 (b) 130 (c) 150 (d) 180

Growth Correlations

7. **Apical dominance is caused by:**

(a) Gibberllins (b)Cytokinins (c) Ethene (d) Auxins

8. **The removal of apex releases the lateral buds from the apical dominance. It is**

(A) Inhibitory effect (B) Compensatory effect (C) Apical dominances (D) Reproduction

Growth and development in animals

9. **Fertilization is the process which leads to the union of:**

(A) Individuals (B) Gametes (C) Sperms (D) Eggs

Chick Development

10. **Cleavage results in the formation of rounded closely packed mass of blastomeres, known as.** **(3-times)**

(a) Morulla (b)Blastulla (c)Gastrula (d)Neurula

11. **The germ layers are formed during** **(2-times)**

(a) Cleavage (b) Gastrulation (c) Organogenisis (d) Growth

12. **Blastomeres are formed during:**

(a) Cleavage (b) Gastrulation (c) Morulla (d) Fertilization

13. **Somites are formed and organized by** **(2-times)**

(a) Ectoderm (b) Mesoderm (c) Endoderm (d) Blastoderm

14. **Immediately after fertilization, the egg undergoes a series of mitotic divisions called:**

(A) Morulla (B) Gastrulation (C) Cleavage (D) Blastulla

15. **During gastrulation the blastoderm splits into two layers, an upper layer of cell is called:**

(a) Hypoblast (b)Area pellucida (c) Epiblast (d) Area opaca

16. The shell, over thick egg, is secreted as it passes through:
(a) Ovary (b) Oviduct (c) Uterus (d) Cloaca

17. The mesodermal cells do not invaginate but migrate medially and caudally from both sides and create a midline thickening called
(a) Hensen's Node (b) Primitive streak (c) Epiblast (d) Hypoblast

18. The cavity formed between somatic and splanchnic mesoderm Is:-
(A) Archenteron (B) Hensen's node (C) Coelom (D) Neurocoel

19. The discoidal cap of cells above the blastocoel is called:
(A) Ectoderm (B) Mesoderm (C) Endoderm (D) Blastoderm

Mechanism of Development

20. The pigment free area that appears at the time of fertilization is called:-
(a) Embryo (b) Yolk (c) Gray crescent (d) White cytoplasm

Role of cytoplasm in Development

21. Clear cytoplasm in an Ascidian zygote produces: **(2-times)**
(a) Muscles cell (b) Larval epidermis (c) Gut (d) Notochord

22. Grey vegetal cytoplasm gives rise to:
(A) larval epidermis (B) notochord (C) muscle cells (D) gut

Aging

23. The negative physiological changes in our body are called: **(3-times)**
(a) Regeneration (b) Degeneration (c) Aging (d) Abnormalities

24. Study of aging is called:
(A) Embryology (B) Teratology (C) Serology (D) Gerontology

Regeneration

25. The unspecialized cells present in flatworms and planaria are:
(A) Neoblasts (B) Osteoblasts (C) Osteoclasts (D) Chondrocytes

Abnormal Development

26. The branch of biology which deals with the study of abnormal development and their causes is called **(2-times)**
(a) Teratology (b) Gerontology (c) Embryology (d) Microcephaly

27. The condition in which an individual has small skull is termed as:
(A) Harelip (B) Microcephaly (C) Diabetes (D) Epilepsy

28. Environmental factors causing abnormal development are grouped together as:
(A) Toxins (B) Carcinogens (C) Mutagens (D) Teratogens

2018

29. The human life span is judged to be maximum of:
(a) 60 – 70 years (b) 70 – 100 years (c) 120 – 125 years (d) 130 – 135 years

30. Secondary growth leads to an increase in the diameter of the:
(a) Stem (b) Root (c) Leaf (d) Stem and Root

31. Which of the following chromosomal abnormalities lead to tallness, aggressiveness, mental defect and anti social behaviour:
(a) XXY (b) XO (c) XXXY (d) XYY

32. A plant has a growth pattern called:
(a) open growth (b) growing point (c) meristem (d) apical meristem

33. Clear cytoplasm, in an ascidian zygote produces:
(A) Muscle cells (B) Larval epidermis (C) Gut (D) Notochord

34. In ascidian fertilized egg, yellow cytoplasm gives rise to:
(A) Muscle cells (B) Larval epidermis (C) Notochord & neural tube (D) Gut

35. Gray equatorial cytoplasm gives rise to:
(A) Neural tube (B) Gut (C) Muscle cells (D) Larval epidermis

36. Hypoblast is mainly presumptive.
(A) Endoderm (B) Ectoderm (C) Mesoderm (D) Blastoderm

2021

37- Cleavage in fertilized egg results in the formation of
(A) Gastrula (B) Blastula (C) Morulla (D) Neurula

38- Which colour cytoplasm of an ascidian fertilized egg gives rise gut_____:
(A) Clear cytoplasm (B) Yellow cytoplasm
(C) Grey equatorial cytoplasm (D) Grey vegetal cytoplasm

39- The ability to regain the lost or injured part of the body is called:
(A) Aging (B) Regeneration (C) Generation (D) Degeneration

40- Movement and rearrangement of the cells in the embryo is called
(A) Gastrulation (B) cleavage (C) fertilization (D) blastula

41- The most prominent structure found in 18 hrs chick embryo is
(A) Primitive streak (B) notochord (C) hensen's node (D) neurocoel

42- Which represents the dorsal and both lateral lips of blastopore?
(A) Primitive streak (B) Henson's Node (C) Coelom (D) Neurocoel

43- A little distance from apex of root and shoot lies the zone of ....
(A) Elongation (B) Maturation (C) Differentiation (D) Isolation

44- Accetabularia is an/a
(A) Angiosperm (B) Bryophyte (C) Alga (D) Fungus

45- The meristems that are found at the tips of roots and shoots are called:
(A) Lateral meristems (B) Intercalary meristems
(C) Secondary meristems (D) Apical meristems

46- Notochord is one of the few prominent structures seen in the embryo of:
(A) 24 hours (B) 22 hours (C) 20 hours (D) 18 hours

47- The final size of a given type of a cell is attained during:
(A) Maturation (B) Differentiation (C) Growth (D) Elongation

48- The peripheral part of the blastoderm where the cells lie unseparated from the yolk is called:
(A) Hypoblast (B) Epiblast (C) Area pellucida (D) Area opaca

49- A group of cells that is capable of division is known as:
(A) Meristem (B) Primordium
(C) Zone of cell division (D) Zone of cell elongation

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	A	C	D	A	C	D	B	B	A	B	A	B	C
15	16	17	18	19	20	21	22	23	24	25	26	27	28
C	C	B	C	D	C	B	D	C	D	A	A	B	D
29	30	31	32	33	34	35	36	37	38	39	40	41	42
C	D	D	A	B	A	A	A	C	D	B	A	B	A
43	44	45	46	47	48	49							
A	C	D	D	A	D	A							

SHORT QUESTION'S AND ANSWER'S OF CHAPTER-19 (GROWTH & DEVELOPMENT) BOARD PAPERS-2011-21

Growth and development

1. **Differentiate between growth and embryonic development.**

Ans:

Growth	Embryonic development
Growth is the permanent and irreversible increase in size that occurs as an organism matures.	The progressive changes which are undergone before an organism acquires its adult form constitute embryonic development.

2. **Differentiate between apical meristem and lateral meristem.**

Ans:

Apical meristem	Lateral meristem
Apical meristem found at the tips of shoot and root. The cells of apical meristem has ability to divide throughout plant life. These are basically related to extension of plant body.	Lateral meristem are cylinder of dividing cells. They are present in dicots and gymnosperms. Vascular cambium and cork cambium are example of lateral meristem. They increase the diameter of root and stem.

3. **Differentiate between growth and development.** **(3-times)**

Ans:

Growth	Development
Increase in size of an organism is called growth. It is an irreversible change.	Different changes occur during the life of an organism is called development.

4. **What is open growth? Discuss.**

Ans: Plants have growth pattern called open growth which means throughout life plants add new organs such as branches, leaves and roots, enlarging from the tip of roots and shoots.

5. **What is growth? Mention its types.** **(3-times)**

Ans: Growth is the permanent and irreversible increase in size that occurs as an organism mature. It has two types. (1) open growth (2) Closed growth.

Types of Growth

6. What are apical meristems?

Ans: These are the cells which are capable of cell divisions and are involved in the primary growth of plants.

7. Define apical and intercalary meristem.

Ans: **Apical meristem**

Apical meristem found at the tips of shoot and root. The cells of apical meristem has ability to divide throughout plant life. These are basically related to extension of plant body.

Intercalary meristem

These are the part of apical meristem which get separated from apex by permanent tissues. They are situated at the base of internode. They play important role in production of leaves and flowers.

8. Differentiate between determinate and indeterminate growth. / Compare determinate with indeterminate growth. (2-times)

Ans:

Determinate growth	Indeterminate growth
In higher plants growth occur at certain points called meristem and whole body do not grow in different planes such a growth is called determinate growth.	In lower plants whole body is capable of growth and which produced an irregular body of plant. Such a growth is called indeterminate growth.

9. Differentiate between primary growth and secondary growth in plant. (6-times)

Ans:

Primary growth	Secondary growth
Primary growth occurs due to the activity of apical meristem which results increase in length or height of plant.	Secondary growth of plants occur due to activity of cambium and it results increase in girth of plant.

Conditions of Growth

10. How do quantity and quality of light effect plant growth? (3-times)

Ans: Light plays important role in the growth of plants:

e.g **Quality of light:**

The red light favours elongation of cells and blue light enhances cell division but retards cell enlargement. Similarly ultraviolet rays also retard cell elongation.

Quantity of light:

Duration of light affects the growth of vegetative & reproductive structures. It also plays a role in inducing or suppressing flowering. The phenomenon is termed as photoperiodism.

11. Give the effect of temperature on plant growth. OR Write down the role of temperature as an external factor in plant growth. (2-times)

Ans: Normal rate of growth increases with rise of temperature and decrease with decrese in temperature. For maximum growth the optimum temperature is 25 to 30^{0}C and it is least at 5-10^{0}C. But at very high temperature 35 to 40^{0}C the rate of growth stops and plant may dies.

12. What are the internal factors which affect the process of growth?

Ans: Internal factors which are involved in plant growth are hormones, water, nutrition, vitamins.

Growth Correlations

13. Write practical applications of apical dominance. (3-times)

Ans: It can be used to produce smooth woody stem.

It is also used to increase the storage life of potato from 1 to 3 years.

14. What is compensatory effect?

Ans: The removal of apex from the apical tip release the lateral buds from the apical dominance, it is called compensatory effect.

15. Define growth correlations. / What is growth correlations? (5-times)

Ans: Development of plant is usually correlated with its growth and different organs grow at different rates in different directions and the development of different parts takes place. This is called growth correlation.

16. Define Apical Dominance. Give its cause.

Ans: In many plant species only apical bud grows while growth of lower axillary buds is inhibited this process is called apical dominance.

Apical dominance is caused by auxin diffusing from apical bud to lateral buds and growth of lateral buds is inhibited.

17. What is difference between inhibitory effect and compensatory effect? / Differentiate between inhibitory effect and compensatory effect. (4-times)

Ans:

Inhibitory effect	Compensatory effect
Auxin diffuses from apical buds to the lateral buds or branches which inhibit the growth of lateral shoots is called inhibitory effect.	When the apex is cut and diffusion of auxin is stopped to the lateral buds it releases the lateral buds from apical dominance is called compensatory effect.

Chick Development

18. Differentiate between area opaca and area pellucida. (5-times) OR How does area opaca differs from area pellucida? (2-times)

Ans:

Area pollucida	Area opaca
Central cells of blastoderm can be separated from yolk and giving the area of translucent appearance called area **pellucida.**	The peripheral part of balstoderm where the cells are unseparated from the yolk is called **area opaca.**

19. What is blastoderm? (3-times)

Ans: The discoidal cap of cells above the blastocoel is called blastoderm. OR

A small disc of cells at the animal end of a reptile or bird embryo that result from early cleavage.

20. What is primitive streak?

Ans: In the chick the mesodermal cells do not invaginate but migrate medially and caudally from both sides and create a mid line thickening called primitive streak.

21. What is morula? (2-times)

Ans: After fertilization of egg it divides repeatedly by mitotic division resulting in a ball of cells called morula.

22. Define blastocoel and neurocoel.

Ans: At blastula stage there is a segmentation cavity formed called blastocoel which is formed by the separation of cell.

With the formation of neural tube, there is the formation of CNS and a cavity enclosed is known as neurocoel.

23. Differentiate between epiblast and hypoblast. (2-times)

Ans:

Epiblast	Hypoblast
During gastrulation blastoderm splits into two layers, an upper layer of cells is called called epiblast.	Lower layer of cells is called hypoblast.

24. What is cleavage? (2-times)

Ans: Immidiately after fertilization, egg undergoes a series of mitotic divisions called cleavage.

25. Name two layers of lateral plate of mesoderm.

Ans: The lateral plate of mesoderm splits into two layers named as somatic mesoderm and splanchnic mesoderm.

26. What is coelom?

Ans: Coelom is called body cavity. It is formed by the splitting of mesoderm into somatic mesoderm and splanchnic mesoderm.

27. How neural plate is formed?

Ans: On the dorasal surface of the gastrula, over the notochord, presumptive neural ectoderm is present in the form of band. As gastrula elongates, the band thickens to from a neural plate.

28. What is discoidal cleavage? **(6-times)**

Ans: In bird's egg the process of cell division is confined to the small disc of potoplasm laying on the surface of yolk at the animal pole. This type of cleavage is called discoidal cleavage.

29. Differentiate between neurula and neurocoel.

Ans

Neurula	Neurocoel
In the embryo of 24 hours the neural folds are clearly visible, at this stage embryo is called neurula.	In the chick development with the formation of neural tube , there is formation of central nervous system and the cavity enclosed is called neurocoel.

Mechanism of Development

30. What is grey crescent? Give its importance. **(3-times)**

Ans: Grey crescent is the pigment free area that appears at the time of fertilization.

Role of cytoplasm in Development

31. Give the role of cytoplasm in the development of an Ascidian.

Ans: Four types of cytoplasm in Ascidian are

i. Clear cytoplasm produces larval epidermis.
ii. Yellow cytoplasm produces muscle cells.
iii. Grey vegetal cytoplasm gives rise to gut.
iv. Grey equitorial cytoplasm produce notochord and neural tube.

Embryonic induction

32. Explain embryonic induction

Ans: Capacity of some cells to induce a specific developmental response in other cells is wide spread phenomena, this is called embryonic induction.

33. Differentiate between primary organizer and primary induction. / What is primary organizer and primary induction. **(2-times)**

Ans:

Primary organizer	Primary induction
The area of the dorsal lip which induces the development of secondary embryo in the host is called primary organizer.	The ability of the primary organizer to induce the growth of secondary embryo in host is called primary induction.

Aging

34. Define aging? Write its two signs. **(4-times)**

Ans: Negative physiological changes in an organism are called aging. Its two symptoms are: wrinkled skin and grey hairs.

35. How aging can be slow down? **(2-times)**

Ans: Aging can be slow down by

i. Taking regular exercise
ii. By taking balanced diet
iii. Avoiding smoking and alcohol
iv. By taking balance diet

36. Define Gerontology.

Ans: Gerontology is the study of aging. It also deals with the causes of aging and measures by which aging can be slowed.

Regeneration

37. What are neoblasts and their role? OR What are neoblasts? / What is their role in development? **(8-times)**

Ans: Neablasts are unspecialized cells which are always present in the body of adult and are mobilized to the site of ampuation, where they are differentiated into specialized cells.

38. What is regeneration? **(3-times)**

Ans: Formation of lost parts of the body is called regeneration. For example if arm of star fish is cut, it will be regenerated or reformed.

Abnormal Development

39. Differentiate between gerontology and teratology. / Define gerontology and teratology. **(4-times)**

Ans:

Gerontology	Teratology
Study of aging is called gerontology.	Teratology is the branch of biology, which deals with abnormal developments and their causes.

40. Define teratology and teratogens. **(4-times)**

Ans: Study of abnormal development is called teratology. Factors causing abnormal development are called teratogens.

41. What are metabolic defects and give two examples?

Ans: Bones are malformed and one organ or its part is missing or it may be repeated.

42. What role is played by clear cytoplasm and yellow cytoplasm in animal development?

Ans: Clear cytoplasm produces larval epidermis and yellow cytoplasm produces muscle cells.

43. Define Regeneration. Give one example.

Ans: The ability to regain or recover the lost part or injured part of the body is called regeneration. For example if lobster loses its pincer claw a new claw regenerates.

44. Write about cleavage and discoidal cleavage.

Ans: The series of mitotic divisions after fertilization of egg is called cleavage. Process of cell division is confined to the small disc of protoplasm laying on the surface of yolk at animal pole. This type of cleavage is called discoidal cleavage.

45. What are teratogens? Give an example.

Ans: Anything which interferes with the normal process of development is the factor causing abnormalities and are known as teratogens.

The examples include: Radiation, Maternal infections, Chemicals and drugs

46. Name the phases of plants growth.

Ans: Phases of plants growth are:

i. Phase of cell division
ii. Phase of elongation
iii. Phase of maturation
iv. Phase of differention

47. Differentiate maturation from differentiation.

Ans:

Maturation	Differentiation
During maturation, the final size of a given type of a cell is attained. The cells which develop into pith, cortex and certain other tissues do not elongate further.	When the cell enlargement ceases, the process of differentiation starts. Wall of cells become pitted, thickening appear on the walls of xylem vessels etc.

48. What are intercalary meristems? Give their role.

Ans: These are the parts of apical meristem which get separated from apex by permanent tissues. They play important role in the production of leaves and flowers.

2019

49. Write any four causes of aging.

Ans: Causes of aging are:

1. The cells of tissues have only a finite number of mitotic divisions.
2. Changes in intracellular substances takes place.
3. Spontaneous mutations may result in loss of cells. .
4. Metabolic problem.

50. What is Hensen's node?

Ans: At the cephalic end of primitive streak, closely pocked cells from a local thickening known as Hensen's node. The Hensen's node however, mark the site of a somewhat special type of invagination.

51. Define aging. Give four signs of aging.

Ans: Aging is an inevitable process and despite all the efforts to inhibit or stop it aging process goes on. It can be defined as negative physiological changes in our body.

1. Loss of hair pigment.
2. Development of small pigmented areas in the skin of face and arms.
3. Dryness and wrinkling of skin.
4. Loss of agility.

52. Write the names of four types of cytoplasm contain in the fertilized egg of ascidian.

Ans: The fertilized egg of an ascidian contains cytoplasm of four different colours that is segregated into different blastomers.

1. Clear cytoplasm
2. Yellow cytoplasm
3. Gray vegetal cytoplasm
4. Gray equatorial cytoplasm.

53. What is meristem? Give example.

Ans: In plants the growth is restricted to certain growing regions which are capable of cell divisions called meristems. Examples root apical meristem and shoot apical meristem.

54. Differentiate between differentiation and maturation.

Ans:

Differentiation	Maturation
When the cell enlargement ceases, the process of differentiation starts. During this growth the walls of cells become thicker, the walls of many kinds of cells and tissues become pitted, thickening appear on the walls of xylem vessels, cells of various tissues differ in spatial dimension and new structural features develops.	During maturation the final size of a given type of a cell is attained, the cells which develop into pith, cortex and certain other tissues do not elongate further along the axis, while the other cells like fibres and tracheids elongate length wise more than in other direction.

55. State regeneration and dedifferentiation.

Ans:

Regeneration	Dedifferentiation
Ability to regain or recover the lost part of the body is called regeneration. For example if arm of a star fish is cut it will regenerated.	The biological process whereby cells revert from a specialized function to a simpler or less specialized form.

56. How development affected by ionizing radiations and nutritional deficiency?

Ans:

Ionizing radiation	Nutritional deficiency
Ionizing radiations such as X-rays are well known for their teratogenic action. Because they have their effect on the developing ovum or spermatazoan, causing damage or changes (mutations) in genes.	Absence of certain nutrients / substances (vitamins, trace elements), toxins and drugs even ingested by mother, effect the differentiation of every tissues in the fetus. If such deficiencies are high, cell may cause death of fetus.

57. Differentiate between neurula and neurulation.

Neurula	Neurulation
When nervous system, is formed in the developing embryo it is termed as neurula.	The process of formation of nervous system is called neurulation.

58. Compare morula with blastula.

Ans:

Morrula	Blastula
Cleavage results in the formation of a rounded closely packed mass of cells / blastomeres. This is morula, it consists of a disc shaped mass of cells two or more layers in thickness lying closely to the yolk.	The morula stage is short lived and soon changes into blastula and is characterized by the presence of a segmented cavity called blastocoels and embryo is termed as blastula.

59. How does coelom develop in chick embryo?

Ans: From the Hensen's node dorsal mesoderm is formed and is organized into somites. The lateral plate mesoderm splitted into two sheets like layers called somatic mesoderm and splanchnic mesoderm, with a cavity between them called coelom.

60. Define teratology.

Ans: Teratology is the branch of Biology, which deals with abnormal development and causes for such development is called teratology.

LONG QUESTION'S OF CHAPTER-19 (GROWTH & DEVELOPMENT) BOARD PAPERS-2011-21

1. Describe internal factors that affect the rate of growth in plants. (3-times)
2. Define aging and explain this process. (5-times)
3. Describe the role of nucleus in development by giving example of Acetabularia (unicellular alga).
4. Discuss the effect of quality of light on photoperiodism.
5. What is regeneration? Explain the process of regeneration in animals. (3-times)
6. Write a note on abnormal development. (2-times)
7. Explain embryonic induction. (2-times)

8. What is growth? Discuss different phases of growth.
9. Explain role of "Cytoplasm in development".
10. Write a note on Growth Correlations.

OBJECTIVE (MCQ'S) OF CHAPTER-20 (CHROMOSOMES & DNA) BOARD PAPERS-2011-21

1. **The Chromosomes were first observed by the German embryologist Walther Fleming in:**
(a) 1880 (b) 1882 (c) 1884 (d) 1886

2. **Walther Fleming first observed chromosomes in the dividing cells of (2-time)**
(a)Frog Larvae (b) Salamander Larvae (c) Sea Urchin Larvae (d) Insect Larvae

3. **In 1882, Chromosomes were first observed by:**
(a) John Brown (b) T.H Morgan (c) Walther Fleming (d)Walter Sutton

4. **The number of chromosomes in mouse is: (3-times)**
(a) 06 (b) 32 (c)26 (d)40

5. **The number of chromosomes in mosquito is:**
(A) 32 (B) 20 (C) 06 (D) 26

Types of Chromosomes

6. **A full set of genes in an individual is called (4-times)**
(a) Gene pool (b) Genome (c)Phenotype (d)Genotype

7. **V- Shaped chromosomes are called:**
(a) Acrocentric (b) Telocentric (c) Metacentric (d)Submetacentric

8. **The particular array of chromosomes that an individual possess is called is:**
(a) Genotype (b) Phenotype (c) Karyotype (d) Epistasis

Composition of Chromosomes

9. **Highly condensed portion of the chromation is called:**
(a)Nucleosome (b) Heterochromatin (c) Euchromation (d) Polysome

10. **Every 200 nucleotides, the DNA duplex is coiled around a core of eight histone proteins forming a complex, known as: (2-times)**
(a) Polysome (b) Heterochromatin (c) Neucleosome (d) Euchromatin

11. **How many million nucleotides are in DNA of typical human chromosomes**
(a) 120 (b) 130 (c) 140 (d)180

12. **Nucleosome occurs every (3-times)**
(a)50 nucleotides (b)100 nucleotides (c)150 nucleotides (d)200 nucleotides

13. **Unlike most proteins, histones are ________**
(A) Positively charged (B) Negatively charged (C) Neutral (D) Discharged

14. **Number of histone protein molecules in a single nucleosome are:**
(A) 06 (B) 09 (C) 08 (D) 10

The chromosomal Theory of inheritance

15. **Chromosomal theory of inheritance was first formulated by:**
(a) Karl correns (b) T.H Morgan (c) Calvin Bridges (d) W. Sutton

16. **A central role for chromosomes in heredity was first suggested in 1900 by**
(a) Karl Correns (b) W. S. Sutton (c) T. H. Morgan (d) F. Griffiths

Chemical Nature of DNA

17. **The 5-carbon sugar in DNA is:**
(a)Maltose (b) Ribose (c) Deoxyribose (d) Lactose

18. **DNA was discovered in:**
(A) 1869 (B) 1864 (C) 1961 (D) 1971

Double helical structure of DNA (Watson – Crick's Model)

19. **The basic structure of human nucleic acid was determined by (3-times)**
(a) Watson and Crick (b) Maurice Wilkins (c) P.A Levene (d) Vernon Ingram

20. **X-ray diffraction analysis of DNA was performed by**
(A) Erwin Chargaff (B) Watson & Crick (C) Rosalind Franklin (D) Charles Darwin

Replication process of DNA

21. **Okazaki fragments are synthesized by (4-times)(2018)**
(a) DNA ligase (b) RNA polymerse (c) DNA polymrase (d) Primase

22. **In euokaryote, numbers of nucleotides in Okazaki fragments are about: (2-times)**
(a) 1000-2000 (b) 100-200 (c) 300-400 (d) 400-500

23. **The enzyme which joins the two pieces of DNA is (3-times)**
(a) DNA polymerase I (b) DNA ligase (c) Restriction endonuclease (d) DNA polymerase

24. **Which strand of DNA elongates towards the replication fork?**
(A) Parental strand (B) Leading strand (C) Lagging strand (D) Sense strand

One –gene/one polypeptide

25. **Beadle and Tatum exposed *Neurospora* spores to:**
(a) X- rays (b) Alpha rays (c) Gamma-rays (d) Beta rays

Cell use RNA to make protein

26. **RNA polymers I is used for the synthesis of (3-times)**
(a) mRNA (b) tRNA (c) rRNA (d) DNA

27. **Human cells contain type of tRNA molecules (3-times)**
(a) 20 (b) 45 (c) 195 (d) 300

Transcription

28. **Copying of mRNA from DNA is called (2-times)**
(a) Translation (b) Transduction (c) Transformation (d) Transcription

29. **mRNA is synthesized by:**
(A) DNA polymerase (B) RNA ligase (C) RNA polymerase (D) Endonuclease

30. **In bacteria the newly synthesized mRNA is released in:**
(A) Nulceus (B) Cytoplasm (C) Mitochondria (D) Nucleolus

Genetic code

31. **A gene starts with codon, Which encodes the amino acid methionine**
(a) UAA (b) UAG (c) AUG (d) UGG

32. **Which of the following is a "Start" codon?**
(a) AUG (b) UAA (c) UAG (d) UGA

33. **The following are non-sense condons except that of:**
(A) AUG (B) UAA (C) UGA (D) UAG

Translation

34. **When information contained in mRNA is used to direct the synthesis of polypeptide by ribosomes, the process is called (3-times)**
(a) Translation (b) Transcription (c) Transduction (d) Transformation

Mutations

35. The ultimate source of all changes is **(2-times)**

(a)Evolution (b) Mutation (c) Genetic drift (d) Migration

36. This condition appears as a result of point mutation:

(A) Down syndrome (B) Turner syndrome (C) Klinefelter syndrome (D) Sickle cell anemia

2018

37. Which one of the given is Non-Sence Codon?

(a) UCC (b) UAA (c) UCG (d) UCU

38. In sickle cell anemia code for glutamic acid is replaced by:

(a) Leucine (b) Histidine (c) Valine (d) Proline

39. A combination of three nucleotides of DNA that specifies an amino acid is called:

(a) Cistron (b) Anticodon (c) Entron (d) Genetic code

40. Which of the following polymerase synthesize tRNA:

(a) RNA polymerase-I (b) RNA polymerase-II (c) RNA polymerase-III (d) RNA polymerase

41. Strand of DNA which is not transcribed is called as:

(a) Template strand (b) Antisense strand (c) Coding strand (d) Lagging strand

42. Every gene starts with initiation codon AUG which normally encodes the amino acid:

(a) Arginine (b) Citruline (c) Lysine (d) Methionine

2019

43. The genetic code for glycine is:

(A) UAG (B) GAU (C) GUA (D) GGU

44. Genetic code for the amino acid methionine is:

(A) AUC (B) UGC (C) CGC (D) AUG

2021

45- In E.Coli the true replicating enzyme is:

(A) DNA polymerase-I (B) DNA polymerase-II

(C) DNA polymerase-III (D) DNA polymerase-IV

46- In mitochondria, the codon UGA signals for

(A) Stop (B) start (C) tryptophan (D) methionine

47- Miescher extracted a white substance from the nuclei of human cells and fish sperm called

(A) Nuclein (B) Penicillin (C) Mucin (D) Adenine

48- The enzyme, which seals the foreign piece of DNA or gene into vector, is called

(A) Restriction enzyme (B) DNA cutter

(C) DNA polymerase (D) DNA ligase

49- TTGACA binding site in prokaryotes is called:

(A) −25 sequence (B) −35 sequence (C) −10 sequence (D) −75 sequence

50- DNA polymerase enzyme which plays a supporting role in DNA replication is:

(A) Polymerase II (B) Polymerase I (C) Polymerase III (D) Polymerase IV

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14
B	B	C	D	C	B	C	C	B	C	C	D	A	C
15	16	17	18	19	20	21	22	23	24	25	26	27	28
D	A	C	A	C	C	C	B	B	B	A	C	B	D
29	30	31	32	33	34	35	36	37	38	39	40	41	42
C	B	C	A	A	A	B	D	B	C	D	C	C	D
43	44	45	46	47	48	49	50						
D	D	C	A	A	D	B	B						

SHORT QUESTIONS AND ANSWERS OF CHAPTER-20 (CHROMOSOMES & DNA) BOARD PAPERS-2011-21

Chromosomes and DNA

1. How many chromosomes are present in mouse and sugar cane? (2-times)

Ans: Sugar cane has 80 while mouse has 40 chromosomes respectively.

Types of Chromosomes

2. Compare telocentric and acrocentric chromosomes.

Ans:

Telocentric Chromosomes	Acrocentric Chromosomes
Telocentric has centromere at one end and chromatid part is present at other end.	Acrocentric has two unequal arms one is short and other is long.

3. Mention the types of chromosomes due to centromeric position. (2-times)

Ans: There are four types of chromosomes

i. Metacentric
ii. Sub metacentric
iii. Acrocentric
iv. Sub metacentric

Composition of Chromosomes

4. Differentiate between heterochromatin and euchromatin. / What is the difference between heterochromatin and euchromatin. (7-times)

Ans:

Heterochromatin	Euchromatin
Highly condensed part of chromatin is called heterochromatin. This part remains permanently condensed and never be expressed.	The part of chromatin other than heterochromatin is called euchromatin. It condenses only during cell division, when compact packaging facilitates the movement of chromosomes.

5. What is nucleosome? OR Define nucleosome. (2-times)

Ans: The DNA duplex is coiled around eight histone proteins forming a complex known as a nucleosome. It appears like beads on a string.

6. Define euchromatin.

Ans: The part of DNA is expressed time to time and condensed only during the cell division is called euchromatin. This coiling helps in movement of chromosomes during cell division.

7. Differentiate between chromosome and nucleosome.

Ans:

Chromosomes	Nucleosomes
Chromosomes are thread like structures which appear inside the nucleus at the time of cell division. They are composed of DNA and protein. They carry the genes on them.	The DNA duplex is coiled around eight histone proteins forming a complex known as a nucleosome. It appears like beads on a string.

The chromosomal Theory of inheritance

8. Give chromosomal theory of inheritance. / State chromosomal theory of inheritance. (2-times)

Ans: According to this theory, genes are located on chromosomes. At the time of cell division all the genes which are present on a chromosome, will go to same cell in which cell chromosome is transported.

DNA as Heredity material

9. What is transformation?

Ans: When DNA of donor cell is inserted into recipient cell it changes the genetic material of recipient cell, this process is called transformation.

10. Define transformation. Name the scientist who worked upon it?

Ans: When the DNA of donor is transferred into recipient cell it brings changes into genetic material of the recipient cell, it is called transformation. Fredrick Griffth first of all performed experiments on it.

Double helical structure of DNA (Watson – Crick's Model)

11. What is contribution of Erwin Chargaff with respect to chemical nature of DNA?

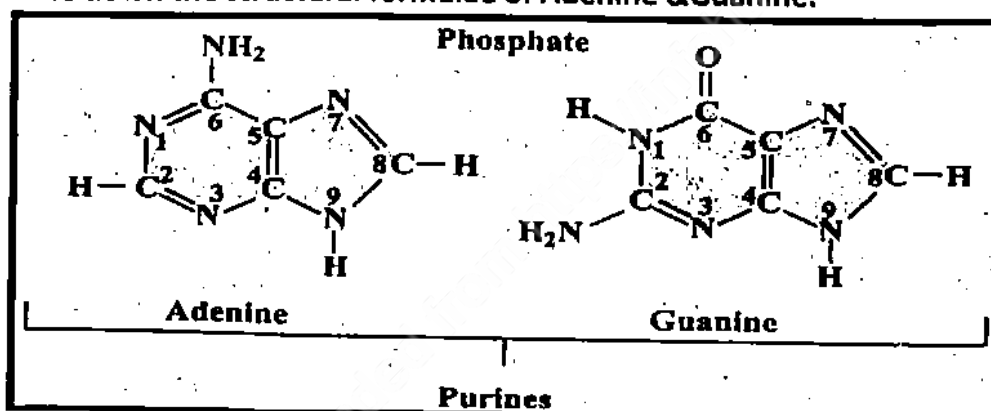
Ans: He formulated Chargaff rule. He proposed that ratio of purines is equal to pyrimidines and ratio of adenine and thymine is equal to guanine and cytosine.

A+T= G+C

12. What are nucleotides?

Ans: Nucleotide is structural unit of DNA. It is composed of nitrogenous base, pentose sugar and phosphate group.

13. Draw structural formula of purines. (2-times)

OR Write down the structural formulae of Adenine &Guanine.

14. What is phosphodiester bond? How it is formed? (3-times)

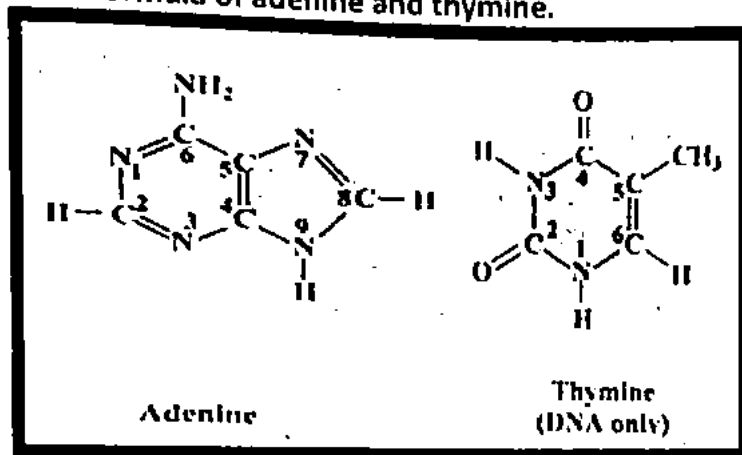
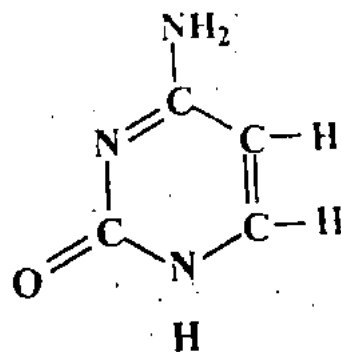
Ans: The reaction between phosphate group of one nucleotide and hydroxyl group of another is a dehydration synthesis, eliminating a water molecule and forming a covalent bond between two groups. This linkage is called a phosphodiester bond.

15. Differentiate between pyrimidines and purines. (4-times)

Ans:

Pyrimidines	Purines
Pyrimidines are nitrogenous bases present in nucleic acids, having only single ringed structure which is only six cornered. Examples: Cytosine, Thymine and uracil.	Purines are another type of nitrogenous bases present in nucleic acids having double ringed structure. One ring is of six cornered while second is of five cornered." Example: Adenine & Guanine.

16. Give structural formula of adenine and thymine.

Adenine Thymine (DNA only)

17. Draw formula of Cytosine.

Cytosine

18. What is phosphodiester linkage?

Ans: The reaction between the phosphate group of one nucleotide and the hydroxyl group of another is dehydration synthesis, eliminating water molecule and forming a covalent bond that links the two groups is called phosphodiester bond.

DNA replication (Meselson –Stahl experiment)

19. Differentiate between conservative and dispersive replication of DNA. (2-times)

Ans:

Conservative replication	Dispersive replication
Conservative model stated that the parental strands would remain intact and generate DNA copies consisting of entirely new molecules.	Dispersive model states that parental DNA would become completely dispersed and that each strand of all the daughter molecules would become mixture of old and new DNA.

20. Differentiate between semi conservative replication and conservative replication. (2-times)

Ans:

Semi conservative replication	Conservative replication
The two strands of double helix of DNA separate out each acting as a model or template, along which new nucleotide are arranged thus giving rise to two new DNA duplexes.	This model states that the parental double helix would remain intact and generate DNA copies consisting of entirely new molecule.

Replication process of DNA

21. Briefly describe replication of lagging strand of DNA. (2-times)

Ans: Lagging strand replicates away from the replication fork. It is synthesized discontinuously as a series of short segments that are later connected. These fragments are called Okzaki fragmernts.

22. Give the functions of the DNA polymerase III. (3-times)

Ans: DNA polymerase III progressively threads the DNA through the enzyme complex, moving at rapid rate, some 1000 nucleotides/second.

23. Define leading and lagging strand of DNA. (2-times)

Ans: Lagging strand is that strand of DNA which is discontinuously synthesized while the strand of DNA which is continuously synthesized is called leading strand.

24. What are Okazaki fragments? Also give their length (4-times)

Ans: During replication of DNA, one of its strands is discontinuously synthesized in the form of fragments called Okazaki fragments. Its length in eukaryotes is 100 to 200 nucleotides while in prokaryotes it is 1000 to 2000 nucleotides.

25. Differentiate between template and coding stands of DNA. (3-times)

Ans:

Template strand	Coding strand
The strand of DNA which is transcribed is called template strand or antisense strand.	The strand of DNA which is not transcribed is called coding strand or Sense strand.

26. Write role of DNA ligase.

Ans: The function of DNA ligase is to fill the nicks (small gaps) or to join the Okazaki fragments to make a continuous strand of DNA.

One –gene/one polypeptide

27. What is gene?

Ans: The sequence of nucleotides that determines the amino acid sequence of a protein is called gene.

Cell use RNA to make protein

28. What is central Dogma? Give its two steps. OR What is Central dogma? (3-times)(2018)

Ans: All organisms use the same basic mechanism of reading and expressing the genes, which is often referred to as central dogma. First step of central dogma is transcription (synthesis of mRNA from DNA) and second step is translation (synthesis of protein from mRNA)

29. Give the chemical composition of RNA. (2-times)

Ans: RNA is composed of nitrogen bases (adenine, guanine, cytosine and uracil), pentose sugar (ribose)and phosphate group.

30. Differentiate between transcription and translation. (2-times)

Ans:

Transcription	Translation
It is the first step of protein synthesis, in transcription mRNA is synthesized from DNA.	It is the second step of protein synthesis in which DNA message for protein synthesis is decoded and polypeptide chain is synthesized.

31. Name types of RNA.

Ans: There are three types of RNA, which are named as

i. Transfer RNA or tRNA
ii. Messenger RNA or mRNA
iii. Ribosomal RNA or r RNA

32. What is tRNA? Give its role.

Ans: tRNA is a type of RNA which is 70 to 90 nucleotides in length. It transfers amino acids during the protein synthesis to the place where protein is synthesized in the cell.

33. Define central Dogma. **(2-times)**

Ans: Central Dogma means all the organisms use the same basic mechanism of gene expression which is referred to as Central Dogma.

Central Dogma consists of two steps

a. Transcription : synthesis of mRNA from DNA
b. Translation: Synthesis of protein from mRNA

Transcription

34. Define sense & antisense strands of DNA?

Ans: The strand of DNA which is transcribed is called template or antisense strand and the opposite strand is called sense strand.

35. What is transcription bubble? How is it formed?

Ans: The DNA strand open at specific place where enzyme is attached to the template strand forming transcription bubble.

36. What is the function of RNA polymerases in transcription? **(2-times)**

Ans: The function of RNA polymerases are as

RNA polymerase –I synthesize rRNA.
RNA polymerase –II synthesize mRNA
RNA polymerase-III synthesize tRNA.

37. What is role of promoter in transcription? **(3-times)**

Ans: Promoter is responsible for the correct initiation of transcription process.

38. How is newly synthesized mRNA protected after transcription? Or how does mRNA strand remain stable during its journey from nucleus to cytoplasm?

Ans: A cap and a tail is added so that molecule may remain stable during its travelling to cytoplasm. The cap is in the form of 7-methyl GTP where as tail is in the form of poly A tail linked to 3′ end of the RNA. These cap and tail protects RNA from action of enzymes.

39. Define transcription. **(2-times)**

Ans: Synthesis of mRNA from the DNA is called transcription. It is first step of central dogma.

40. Differentiate between transcription and replication.

Ans:

Transcription	Replication
Transcription is the process in which RNA is synthesized from DNA.	Replication is the process in which an exact copy of a molecule (for example DNA) is produced.

41. What is meant by promoter?

Ans: A specific nucleotide sequence to which RNA polymerase attaches and initiate transcription of mRNA from a gene.

Genetic code

42. What is universality of genetic code? **(3-times)**

Ans: It means it is same for all the organisms. Because of the universality of codon the genes can be transferred from one organism to another and successfully transcribed and translated in their new host.

43. Define initiation codon. What does it codes for?

Ans: Initiation codon is first codon in the process of protein synthesis from where protein synthesis starts. It codes for methionine.

44. Enlist non sense codons and their function. **(2-times)(2018)**

Ans: Non sense condons do not specifiy any amino acid. They are used to terminate or to stop the protein synthesis. Their names are UAA, UGA and UAG.

45. Define genetic code.

Ans: Genetic code is combination of three nucleotides, which specify a particular amino acid.

46. Differentiate between codon and anticodon.

Ans:

Codon	Anti codon
Codon is sequence of three nucleotides present on mRNA and specifies an amino acid. For example codon for methionine is AUG	Anticodon is the sequence of three nucleotides present on tRNA, anti codon of metionine is UAC

47. Enlist initiation codon and non-sense codons.

Ans: Initiation codon is AUG and non sense condons are UAA, UAG and UGA

48. Define genetic code. Give its properties.

Ans: Genetic code is combination of three nucleotides, which specify a particular amino acid.

Properties of genetic code are:

i. Gentic code is universal
ii. Getic code is coma less
iii. Gentic code is triplet

Translation

49. How is translation terminated?

Ans: When a chain terminating non sense codon is exposed, this non sense codon do not bind any tRNA but they are recognized by release factor, protein that release the newly made polypeptide from the ribosome.

50. What is translation? OR Define translation. **(4-times)**

Ans: Synthesis of protein from the mRNA is called translation. It is second step of central dogma.

Mutations

51. Define phenylketonuria. OR What is phenylketonuria? **(7-times)**

Ans: In phenylketonuria, phenylalanine is not degraded because of defective enzyme phenylalanine hydroxylase. Phenylalanine consequently accumulates in the cells leading to mental retardation, as the brain cells fails to develop in infancy. This disorder is due to point mutation.

52. What is point mutation? Give two examples. OR Define mutation. Give one example. **(4-times)**

Ans: Point mutations are mutational changes that affects the message itself, producing alterations in the sequence of DNA nucleotides. If alteration involves only one or few base pairs in the coding sequence they are called point mutations. For example sickle cell anemia and phenylketonuria.

53. Describe briefly sickle cell anemia.

Ans: In sickle cell anemia a point mutation leads to the change of amino acid glutamic acid into valine at position 6 from N terminal end in beta chain. This consequently alters the tertiary structure of haemoglobin reducing its ability to carry oxygen.

54. Define chromosomal aberrations.

Ans: Chromsomal aberrations are mega changes which involve presence of an extra chromosome or loss of a chromosome from the diploid number of chromosomes or changes like addition, insertion, inversion and duplication.

55. Define Mutation.

Ans: The sudden change in DNA or gene is called mutation.

56. What are chromosomal aberrations? Give its reasons.

Ans: Unequal distribution of chromosomes in daughter cell during cell division or any change in the structure of chromosomes leads to abnormalities in chromosomes in daughter cell, it is called chromosomal aberration.

57. What is the difference between R, and S, type of bacteria?

Ans:

R Form	S Form
The mutant form of *streptococcus pneumoniae* bacteria, which lacks an enzyme needed to manufacture the polysaccharide coat is called the R form because it forms Rough colonies on growth medium.	The normal pathogenic form of *streptococcus pneumoniae* bacteria is referred as the S form because it forms smooth colonies on a culture dish.

58. What is Semi – Conservative Model of DNA Replication?

Ans: In semi conservative replication, the two strands of the duplex separates out each acting as a model or mold, along which new nucleotides are arranged thus giving rise to two new duplexes. In this process, by separation of two strands, primary structure has been conserved, whereas the secondary structure has been disrupted.

59. What is mutation? Give its name of two classes.

Ans: "Changes in the DNA occur either due to mistake in replication or damage to the genetic messages is known as mutations." Its classes are:

1- point mutations 2- Chromosomal aberrations

60. What is one-gene one polypeptide hypothesis? (2-times)

Ans: Beadle and tatum concluded that genes produce their effects by specifying the structure of enzymes and that each gene encodes the structure of one enzyme. They called this relationship one – gene/one-enzyme hypothesis. Because many enzymes contain multiple protein or polypeptide subunits, each encoded by a separate gene, the relationship is today more commonly referred to as "one gene/one – polypeptide".

61. What are mutagens? Give one example.

Ans: In genetics, a mutagen is a physical or chemical agent that changes the genetic material, usually DNA of an organism and thus increases the frequency of mutations.

For example: X-rays, ultraviolet radiations etc.

62. What is a phosphodiester bond?

Ans: The reaction between the phosphate group of one nucleotide and the hydroxyl group of another is a dehydration synthesis, eliminating a water molecule and forming covalent bond that links the two groups. The linkage is called a phosphodiester bond.

63. How many DNA polymerases are found in prokaryotes? Write their names.

Ans: There are three DNA polymerases namely I, II and III in bacteria.

(i) DNA polymerase I (ii) DNA polymerase II

(iii) DNA polymerase III

64. How many chromosomes are found in ferns and in frog?

Ans: Number of chromosomes found in ferns are more than 500 pairs.

Number of chromosomes found in frog are 26.

65. Differentiate between sense and anti sense strands of DNA. (4-times)

Ans:

Sense strand	Anti-sense strand
The strand of DNA which is opposite to the antisense strand and is not transcribed is known as sense strand or coding strand.	Only one of the two strands of DNA are transcribed. This strand is called template strand or the antisense strand.

66. Where codon and anticodon are situated?

Ans: Codon are situated on mRNA (messenger RNA) while anticodon are situated on tRNA (transfer RNA).

67. What is Inversion?

Ans: An inversion is a chromosome rearrangement in which a segment of a chromosome is reversed end to end. An inversion occurs when a single chromosome undergoes breakage and rearrangement within itself.

68. Differentiate between leading and lagging strands of DNA.

Ans:

Leading strand	Lagging strand
Leading strands, which elongates towards the replication fork, is build up simply by adding nucleotides continuously to its growing 3' end.	Lagging strand elongates away from the replication fork and is synthesized discontinuously as a series of short segments that are later connected. These are known as Okazaki fragments.

69. How many Chromosomes are found in Penicillum and Mosquito?

Ans: Penicillium a fungus has only one pair of chromosomes while a mosquito has 6 chromosomes.

70. Define Dispersive Replication of DNA.

Ans: The dispersive model predicted that parental DNA would become completely dispersed and that each strand of all the daughter molecules would be a mixture of old and new DNA.

71. What do you know about the term Transcription?

Ans: This is the process in which an RNA copy of the DNA sequence encoding the gene is produced with the help of an enzyme, RNA polymerase.

72. What are chromosomal abberrations? Quote examples as well.

Chromosomal aberrations are megachanges which involve presence of an extra chromosome or loss of a chromosome from the diploid number of chromosomes, or changes like deletions, insertions, inversion etc. in the parts of the chromosomes. Such chromosomal aberrations lead to syndromes like Down's syndrome, klinefelter's syndrome.

73. Name three types or RNA's. Give function of each RNA.

Ans: There are three types of RNA:

1. The class of RNA found in ribosome is called ribosomal RNA (rRNA). During translation, rRNA provides the site where polypeptides are assembled.
2. Transfer RNA molecules transport the amino acids to the ribosomes for use in building the polypeptides and also position each amino acid at the correct place on the elongating polypeptide chain.
3. Messenger RNA are long strands of RNA that are transcribed from DNA and that travel to the ribosomes to direct precisely which amino acids are assembled into polypeptides.

74. Give the role of mRNA and tRNA in translation.

Ans: Messengers RNA (mRNA) carries the genetic information copied from DNA in the form of a series of three base code words each of which specifies a particular amino acid. Translation is the whole process by which the base sequence of an mRNA is used to order and to join the amino acids in a protein.

The function of tRNA is to read the message of nucleic acids, or nucleotides and translate it into proteins or amino acids.

In translation each individual codon corresponds to an amino acid.

75. How do histone and DNA interact with each other in nucleosome.

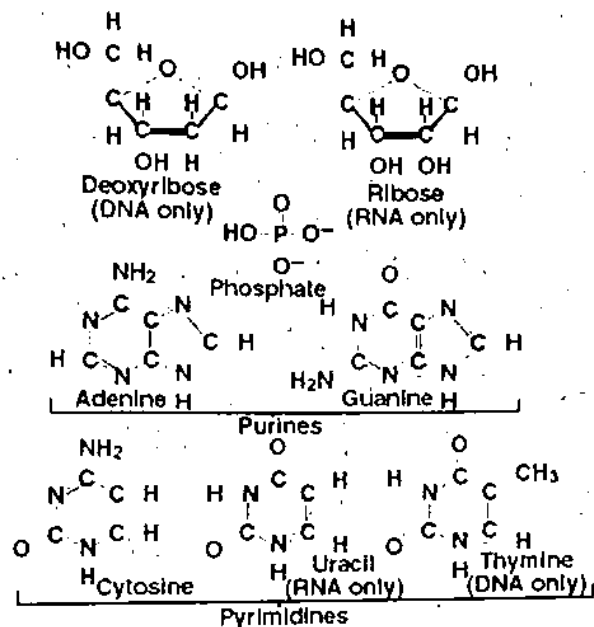
Ans: Histones are positively charged, they are thus strongly attracted to the negatively charged phosphate groups of the DNA. The histone core thus act as magnetic forms that promote and guide the coiling of the DNA.

76. **Give two limitations of DNA polymerase III in DNA replication.**

Ans: DNA polymeras III can add nucleotides only to a chain of nucleotides that is already paired with the parent strand. Hence DNA polymerase cannot initiate synthesis on its own.

Another feature of DNA polymerase III is that it can add nucleotides only to the 3' and of a DNA strand.

77. **Write down the structural formulae of cytosine and thyamine.**

Ans:

78. **Define karyotype.**

Ans: The particular array of chromosomes that an individual possesses is called its Karyotype.

79. **Briefly describe Alkaptonuria disease.**

Ans: In alkaptonuria the patients produced urine that contained homogentisic acid. This substance oxidized rapidly when exposed to air, turning the urine black. In normal individuals, homogentisic acid is broken down into simpler substances with considerable insight. Garrod concluded that patients suffering from alkaptonuria lacked the enzyme necessary to catalyze this breakdown.

80. **Define promoter and what is its role?**

Ans: Transcription starts at RNA polymerase binding site called promoter on the DNA template strand. In prokosryotes within promoter there are two binding sites TTGACA also called-35 sequence and TATAAT sequence also called-10 sequence, which have affinity for the RNA polymerase. In eukaryotes these sites are at-75 and-25 sites respectively. The binding of RNA polymerase to the promoter is the first step in the gene transcription.

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81. **Define transcription and anticodon.**

Ans: **Transcription:** The process of formation of mRNA from DNA is called transcription.

Anticodon is the sequence of three nucleotides in the mRNA that complementary to the codon.

82. **What is meant by nucleosome and gene?**

Ans: **Nucleosome:** Every 200 nucleotides, the DNA duplex is coiled around a core of eight histone protein molecules forming a complex known as a nucleosome.

Gene: The sequence of nucleotides that determines the amino acid sequence in a protein is called gene.

83. Define promoter region. Which binding sites are present in this region?

Ans: promoter: Transcription starts at the RNA polymerase binding site called promoter on the DNA tempelate strand.

In prokaryotes with in promoter there are two binding sites TTGACA also called -35 sequence and TATAAT also called -10 sequences, which have affinity for the RNA polymerase. In eukaryotes theses sites are at -25 and -70 sites.

84. Which is the true replicating enzyme in E. coli? Also write its structural feature.

Ans: The true replicating enzyme in *E.coli* is DNA polymerase III which is 10 times larger and far more complex in structure. The enzyme is a dimer and catalyzes replication of one DNA strand.

Polymerase III progressively threads the DNA through the enzyme complex, moving at a rapid speed, some 1000 nucleotides per second. One of the features of DNA polymerase III is that it can add nucleotides only to chain of nucleotides that is already paired with parent strand.

85. Differentiate between nucleotide and nucleoside.

Ans:

Nucleoside	Nucleotide
It is a molecule which is formed when pentose sugar and nitrogen base react with each other.	It is a molecule which is formed when nucleoside and phosphate group react with each other.

86. Name four important enzymes involved in DNA replication.

Ans: Following are the enzymes which are involved in replication of DNA.

i. DNA polymerase III
ii. Helicase
iii. Primase
iv. DNA ligase

87. Define one gene one enzyme hypothesis and transformation.

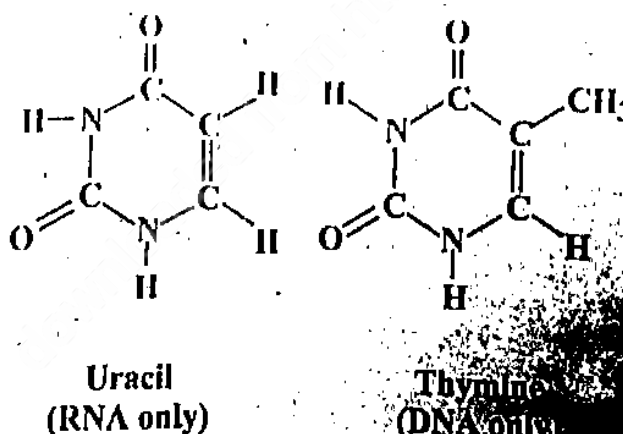
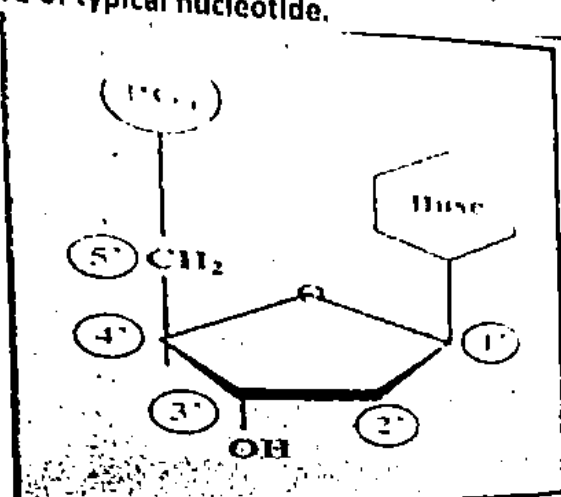
Ans:

One gene one enzyme hypothesis	Transformation
According to Beadle and Tatum genes produce their effects by specifying the structure of the enzymes and that each gene encodes the structure of one enzyme they called this relationship one- gene/one enzyme hypothesis.	Transformation is the transfer of genetic material from one cell to another and can alter the genetic makeup of the recipient cell.

88. What is Karyotype? Give its significance.

Ans: The particular array of chromosomes that an individual possesses is called its karyotype.

Significance: Karyotype is helpful in differentiation of chromosomes of different species and sometimes even among the individuals of the same species.

89. Give structural formula of cytosine and thymine.

90. Give the structure of typical nucleotide.

LONG QUESTIONS OF CHAPTER-20 (CHROMOSOMES & DNA) BOARD PAPERS-2011-21

1. How did Hershey and Chase demonstrate that DNA is the hereditary material?
2. Explain the one gene one polypeptide hypothesis.
3. How DNA replicates? (4-times)
4. Give the chemical nature of DNA. (2-times)
5. Describe the process of transcription and draw the model of transcription bubble. (2-times)
6. How Morgan experimentally proved the theory of heredity?
7. Write a note on mutation.
8. What is karyotpe? Write down types of chromosomes with respect to centromeric position diagrammatically.
9. Describe the function of DNA polymerase III in the process of replication.
10. Elaborate chromosomal theory of heredity.
11. How did Meselson and Stahl prove that DNA replication is semi conservative? (2 times)
12. How would you prove that DNA replicates by semi conservative method. (2 times)
13. Describe the chemical composition of chromosome. (2-times)
14. Describe the process of transformation.
15. What is genetic code? Describe its characteristics.
16. How the cells use RNA to make protein? (3-times)

17. Describe Griffith's experiment to prove DNA as hereditary material.
18. Describe different types of RNA with their roles.
19. Explain Meselson-Stahl experiment.
20. Sketch DNA replication fork and label. (no description)
21. What are chromosomes? What do you know about their types?
22. Explain Watson and Crick's Model of DNA. (2-times)
23. Discuss the process of initiation of translation along charging or tRNA.

OBJECTIVE (MCQ'S) OF CHAPTER-21 (CELL CYCLE) BOARD PAPERS-2011-21

Cell cycle Introduction

1. Chromosomes appear inside the nucleus at the time of:
(A) Cell division (B) Cell elongation (C) Cell maturation (D) Cell differentiation

Interphase

2. The Chromosomes number becomes doubled during:
(a) G_1 -Phase (b) G_2 –Phase (c) S - Phase (d) G_o - Phase

3. It is the period of extensive metabolic activity (3-times)
(a) G_1 (b) S-Phase (c) G_2 phase (d) G_0 phase

4. In the case of human cell, cell cycle duration is about (3-times)
(a)24 hours (b)23 hours (c)22 hours (d)21 hours

5. The period of life cycle of cell between two consecutive divisions is termed as:
(A) Resting Phase (B) Interphase (C) G_1 Phase (D) G_2 Phase

6. Chromosomal part which uncoils, during interphase is called:-
(a) Euchromatin (b) Heterochromatin (c) Chromatids (d) Satellite DNA

7. Nerve cells and eye lens cells remain in________ stage for life time.
(a) G_1 (b) G_2 (c) G_0 (d) S

8. Length of cell cycle in yeast cells is
(a) 30 minutes (b) 60 minutes (c) 90 minutes (d) 120 minutes

9. Period of non-apparent division is called:
(A) Cell cycle (B) Interphase (C) Mitotic phase (D) Meiosis

10. Post mitotic cell can exit the cell cycle during phase: (2-times)
(A) G-0 (B) G-1 (C) G-2 (D) S

Mitosis

11. The stage of mitosis at which chromatids separate as independent structures (chromosomes) in the (2-times)
(a) Prophase (b) Telophase (c) Metaphase (d) Anaphase

12. The spindle fibers are composed of RNA and protein called (3-times)
(a) Insulin (b) Tubulin (c) Actin (d) Myosin

13. The centriole lies within the (2-times)
(a) Karyosome (b) Centrosome (c) Chromosome (d) Nucleosome

14. The microtubules are composed of proteins tubulin and traces of: (2-times)
(a) DNA (b) NAD (c) FAD (d) RNA

15. At cytokinin, in plants, a membrane structure phragmoplast is formed from vesicles which originate from: (3-times)
(a) Lysosomes (b) Endoplasic retcuium (c) Golgi complex (d) Centrioles

16. The most critical phase of mitosis, which ensures equal distribution of chromatids in the daughter cells is:
(a) Anaphase (b) Metaphase (c) Prophase (d) Telophase

17. During cell division, the nuclear division is called (2-times)
(a) Cytokinesis (b) Karyokinesis (c) Plasmolysis (d) Diakinesis

18. Mitotic apparatus is organized during (2-times)
(a) Prophase (b) Metaphase (c) Anaphase (d) Telophase

19. Special type of cell division in which the number of chromosomes in daughter cells is reduced to half as compared to parent cell is called as
(A) Mitosis (B) Budding (C) Parthenogenesis (D) Meiosis
20. Pairing of homologous chromosomes is called as
(A) Synapse (B) Synapsis (C) Bivalent (D) Tetrad
21. Pairing of homologous chromosomes for tetrad formation starts at:
(A) Zygotene (B) Leptotene (C) Pachytene (D) Diplotene
22. Karyokinesis involves division of:
(A) Cell (B) Nucleus (C) Cytoplasm (D) Cell membrane
23. During cell division the nuclear division is called:
(A) Cytokinesis (B) Karyokinesis (C) Karyotype (D) Plasmolysis
24. The microtubule is composed of traces of RNA and protein called: (2-times)
(A) Myosin (B) Troponin (C) Actin (D) Tubulin
25. Each chromosome when visible consists of two unseparated replicas:
(A) Chiasma (B) Tetrad (C) Homologus chromosome (D) Chormatids

Cancer

26. The spread of tumor cells and establishment of secondary areas of growth is Called: (4-times)
(a) Epistatis (b) Prostasis (c) Pleiotropy (d) Metastasis
27. An unwanted clone of cells and establishment of secondary areas of growth is called: (3-times)
(a) Tumor (b) Growth (c) Lump (d) Swelling
28. The tumor which is localized and not transferred to other body parts: (2-times)
(A) Malignant (B) Benign (C) Apoptosis (D) Necrosis
29. Which of the following behaves like normal cells?
(A) Benign tumor (B) Malignant tumor (C) Cancer (D) Gall
30. Cancer is caused mainly by mutation in:
(A) Somatic cells (B) Malignant cells (C) Sex cells (D) Reproductive cells

Meiosis

31. Least number of chiasma are present during (3-times)
(a) Leptotene (b) Diakinesis (c) Pachytene (d) Diplotene
32. The condensation of chromosomes reaches to its maximum phase during: (2-times)
(a) Leptotene (b) Pachytene (c) Zygotene (d) Diakinesis
33. Crossing over during meiosis occurs in stage: (4-times)
(a) Diplotene (b) Pachytene (c) Zygotene (d) Laptotene
34. Meiosis generally takes place in plants during formation of:
(a) Gametes (b) Spores (c) Zygote (d) Embryo
35. The stage of meiosis that lasts for days, weeks or even years is (4-times)
(a) Laptotene (b) Zygotene (c) Pachytene (d) Diplotene
36. Each bivalent is consists of four: (3-times)
(a) Chromosomes (b) Chromatids (c) Chiasmata (d) Spores
37. The prophase stage in which the chromosomes become visible shorten and thick: (2-times)
(a) Leptotene (b) Zygotene (c) Pachytene (d) Diplotene
38. In which stage of meiosis, the paired chromosomes repel each other and begin to separate (4-times)
(a) Leptotene (b) Zygotene (c) Pachytene (d) Diplotene

39. **Synapsis takes place in: OR Synapsis occurs during: (2-times)**
(A) Leptotene (B) Zygotene (C) Pachytene (D) Diakinesis

40. **Meiosis-II is just like the:**
(A) Amitosis (B) Mitosis (C) Regeneration (D) Replacement

Meiotic errors

41. **The autosomal non-disjunction in man in which 21^{st} pair of chromosomes fails to segregate resulting in gamete with 24 chromosomes is called:**
(a) Down's syndrome (b) Turner's syndrome
(c) Klinfelter's syndrome (d) Jacob's syndrome

42. **The syndrome having trisomy at chromosome pair number 21 is:**
(a) Turner's (b) Down's (c) Patau's (d) Edward's

43. **Individual with klinefelters syndromes have sex chromosomes as following:**
(a)XO (b) XXO (c) XXY (d)XXXY

44. **In non-disjunction chromosomes fail to segregate during: (4-times)**
(a) Prophase (b) Metaphase (c) Anaphase (d) Telophase

45. **All are related to turner's syndrome, except: (2-times)**
(a) Short stature (b) Webbed neck (c) Broad face (d) Without ovaries

46 **Unequal separation of chromosomes is called:-**
(a) Disjunction (b) Separation (c) Non-disjunction (d) Metastasis

47. **If mother's age is above 45 years, then ratio of Down's syndrgme is:**
(A) $\frac{1}{1000}$ (B) $\frac{3}{1000}$ (C) $\frac{1}{100}$ (D) $\frac{3}{100}$

48. **The frequency of occurrence of Down's syndrome is:**
(A) $\frac{1}{700}$ (B) $\frac{1}{1000}$ (C) $\frac{1}{500}$ (D) $\frac{1}{200}$

49. **The sex chromosomes of the person affected with klinefelter's syndrome are:**
(A) SYY (B) XXX (C) XXY (D) XY

50. **Mongolism is the other name of: (2-times)**
(A) Down's syndrome (B) Klinefelter's syndrome (C) Turner's syndrome (D) Jacob's syndrome

Necrosis and Apoptosis

51. **Cell death due to tissue damage is called: (4-times)**
(a)Apoptosis (b) Metastasis (c) Necrosis (d) Suicide

2018

52. **Chiasmata formation takes place during:**
(a) Leptotene (b) Diakinesis (c) Pachytene (d) Diplotene

53. **Meiosis occurs only in:**
(a) Haploid cells (b) Diploid cells (c) Triploid cells (d) Pentaploid cells

54. **Apoptosis is:**
(a) Division of cells (b) Death of cells by tissue demage
(c) Suicide of cells (d) Weaknesss of cells

55. **Cell cycle involves:**
(a) growth of cell (b) replication of DNA
(c) Cell division (d) growth of cell, replication of DNA cell division

56. **The division of whole cell is called:**
(a) karyokinesis (b) cytokinesis (c) interphase (d) kinetochore

57. **The pairing of homologous chromosomes is completed in:**
(a) leptotene (b) zygotene (c) pachytene (d) diplotene

2019

58. Contractile ring in cytokinesis is formed by:
(A) Tubulin (B) Actin and Myosin (C) Keratin (D) Cyclins
59. In turner syndrome the affected person have set of chromosomes:
(A) XO (B) XXY (C) XYY (D) XXO
60. The leptotene and zygotene lasts for:
(A) few hours (B) few days (C) few weeks (D) few years
61. The chromatin material gets condensed by folding and chromosomes appear as thin thread in mitosis at the beginning of:
(A) Interphase (B) Prophase (C) Metaphase (D) Anaphase
62. The chromatids repel each other during:
(A) Zygotene (B) Pachytene (C) Diplotene (D) Diakinesis
63. Programmed and organized process of cell death is called:
(A) Apoptosis (B) Necrosis (C) metastasis (D) Metamorphosis
64. Separation of homologous chromosomes occur during:
(A) Prophase (B) Metaphase (C) Anaphase (D) Telophase
65. Which pair of chromosome fails to segregate in Down's syndrome.
(A) 7 th (B) 15 th (C) 19 th (D) 21 th

2021

66- The syndrome in which male has enlarged breasts, obesity and small testes with no sperms is:
(A) Down's Syndrome (B) Turner's Syndrome
(C) Klinefelter's Syndrome (D) Jacob's Syndrome
67- During Prophase I of Meiosis, Tetrads are formed in
(A) Leptotene (B) Zygotene (C) Pachytene (D) Diplotene
68- If a person has 44 autosomes and xyy, he will suffer from
(A) klinefelter's syndrome (B) turner's syndrome
(C) Down's syndrome (D) mongolism
69- Healing of fracture and repair of the skin are examples of
(A) Reproduction (B) Mutation (C) Regeneration (D) Induction
70- Each bivalent has chromatids wrap around each other
(A) 02 (B) 04 (C) 06 (D) 08
71- In diplotene, homologous chromosomes remain united by their point of interchange called
(A) Bivalent (B) Centromere (C) Synapse (D) Chiasmata
72- Down's syndrome has number of chromosomes:
(A) 47 (B) 45 (C) 46 (D) 44
73- Individuals having 45 chromosomes with one missing "X" chromosome are affected by:
(A) Down's syndrome (B) Klinefelter's syndrome
(C) Turner's syndrome (D) Edward's syndrome
74- The S-phase of cell cycle takes:
(A) 9 hours (B) 4.5 hours (C) 1.30 hours (D) 10 hours

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	C	A	A	B	A	C	C	B	B	D	B	B	D
15	16	17	18	19	20	21	22	23	24	25	26	27	28
C	A	B	A	D	B	A	B	B	D	D	D	A	B
29	30	31	32	33	34	35	36	37	38	39	40	41	42
A	A	D	D	B	B	C	B	A	D	B	B	A	B
43	44	45	46	47	48	49	50	51	52	53	54	55	56
C	C	C	C	D	B	C	A	C	C	B	C	D	B
57	58	59	60	61	62	63	64	65	66	67	68	69	70
C	A	A	A	B	C	A	C	D	C	B	A	C	B
71	72	73	74										
D	A	C	D										

SHORT QUESTION'S AND ANSWER'S OF CHAPTER-21 (CELL CYCLE) BOARD PAPERS 2011-21

Interphase

1. How chromatin differs from chromosomes? (3-times)

Ans: Chromatin is thread like network, it is formed when chromosomes becomes uncoiled.

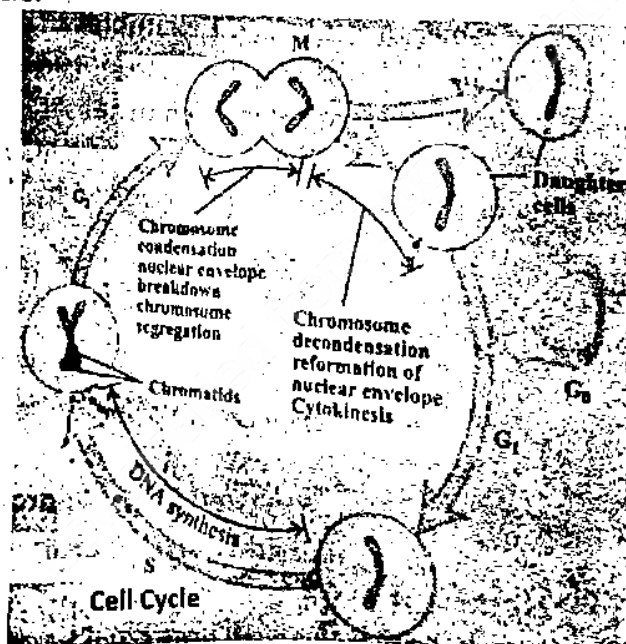
Chromosomes are composed of DNA and proteins. When chromatin is highly coiled it changes into chromosomes.

2. Define cell cycle. Give its phases. (6-times)

Ans: Events or changes occur during the division of a cell is called cell cycle. It has two phases. i) Interphase ii) Mitotic phase

3. Describe changes occur during G_1 phase. / What changes occur in a cell during G1-phase of interphase. (5-times)

Ans: It is the period of extensive metabolic activities, in which cell normal grows in size, specific enzymes are synthesized and DNA base units are accumulated for the DNA synthesis.

4. Draw cell cycle.

5. **Give length of cell cycle during mitosis in human cell.**

Ans: In human average cell cycle is about 24 hours. Mitosis takes 30 minutes, G_1 phase takes 9 hours, S-phase takes 10 hours, and G_2 phase takes 4.5 hours.

6. **Define cell cycle.**

The cell undergoes a sequence of changes, which involves period of growth, replication of DNA, followed by cell division. This sequence of changes is called cell cycle.

7. **What is Interphase? Write the names of its sub stages.**

Ans: The period of life cycle of cell (Cell Cycle) between two consecutive divisions is termed as the interphase, or misleadingly termed as the resting phase: Its sub stages are:

i. G1-phase ii. S-phase iii. G2 –phase

In some cells G_0 may present.

Mitosis

8. **How and when the phragmoplast originates?** (3-times)

Ans: Phragmoplast originates from the Golgi vesicles or Golgi apparatus. Vesicles cuts of from the Golgi apparatus and arranged at the equator to form phragmoplast. Phragmopalst originate at the time of cytokinesis in plant cells.

9. **Define mitotic apparatus. OR Give its functions. OR What is mitotic apparatus? / What are the functions of mitotic apparatus?** (6-times)

Ans: Mitotic apparatus composed of spindle fibres, centriols and asters. Mitotic apparatus plays an important role in cell division and equal distribution of chromosomes during cell division.

10. **Distinguish between karyokinesis and cytokinesis.** (7-times)

Ans:

Karyokinesis	cytokinesis
Divison of nucleus is called karyokinesis.	Division of cytoplasm is called cytokinesis.

11. **Write about the stage of telophase of mitosis.**

Ans: During telophase of mitosis, nuclear membrane and nucleolus reappear, mitotic apparatus disappears and two nucleoli are formed in one cell.

12. **What events occur in anaphase of mitosis?** (4-times)

Ans: During anaphase of mitosis spindle contract and centromere divides and two sets of chromosomes are formed. Each set of chromsosmes moves towards opposite poles. So that each pole receive one set of chromosomes.

13. **How cytokinesis differ in plant and animal cell?**

Ans:

Cytokinesis in plants	Cytokinesis in animals
In plants cytokinensis occur by phragmoplast formation. Golgi vesicles arrange in the centre and fuse with each other forming cell wall between two daughter nuclei which in turn divides into two daughter cells.	In animals the cytokinesis occurs by inward pinching of cell membrane and parent cell divides into two daughter cells.

14. **What are three sets of microtubules which originate from each pair of centriole during mitosis?** (3-times)

Ans: Three sets microtubules originate from centrioles are asteral microtubules radiate outward and form aster while other two sets of microtubules compose the spindle i.e the kinetochore microtubules and polar microtubules.

15. **Give four importance of mitosis.**

i. It transfers unchanged genetic information to the daughter cells.
ii. It helps in all types of asexual reproduction like cloning, tissue culture etc.
iii. It helps in healing of wounds.
iv. It maintains the chromosomes number constant.

16. What is the importance of kinetochore in the alignment of chromosomes during mitosis?

Ans: Spindle fibres attaches at kinetochore of chromosomes and they help to align chromosomes at the centre of cell to form equatorial plate or metaphase plate.

Cancer

17. Define metastasis. OR What is metastasis? **(4-times)(2018)**

Ans: The cells composing a malignant tumor or cancer, divide more rapidly, mostly invade surrounding tissues, get into the body's circulatory system, and set up areas of proliferation away from their site of original appearance. This spread of tumor cells and establishment of secondary areas of growth is called metastasis.

18. "Cancer is uncontrolled cell division". Explain. **(3-times)**

Ans: It is called so because genes controlling the cell division lose their control over cell division and cell divides without any control, so it is called uncontrolled cell division.

19. Differentiate between cancer cell and normal cell or Write at least three characters of cancer cells. / Write any two differenes between cancer cell and normal cell. **(2-times)**

Ans: Cancer cell can be distinguished from normal cells because they are less differentiated than normal cells, exhibit the characteristics of rapidly growing cell, i.e., is high nucleus to cytoplasmic ratio, prominent nucleoli and many mitosis.

20. Differentiate between malignent and benign tumor. **(6-times)**

Ans:

Maligent tumor	Benign tumor
Malignant tumor or cancer divides more rapidly, mostly invade surrounding tissues get enter in circulatory system for spreading into other body parts.	The small sized local tumor is called benign tumor. Its cells behaves like normal cells and less dangerous.

21. Give four important functions of mitosis.

Ans: Four functions of mitosis are

a. Asexual reproduction is due to mitosis
b. Healing of wounds and regeneration is also due to mitosis
c. It ensure equal or same number chromosomes in daughter cell
d. It transfer characters from parents to offspring without any change

Meiosis

22. Characterize pachytene stage of meiosis.

Ans: Pairing of homologous chromosomes is completed, chromosomes become further thick and short and crossing over takes places by chiasmata formation.

23. Define crossing over. Give its significance. **(3-times)**

Ans: It is exchange of segments of chromosomes between non sister chromatids. Its significance is that, it provides raw material for evolution and also form new recombination of genes.

24. What change occurs in dividing cell during zygotene?

Ans: First essential phenomenon of meiosis i.e., pairing of homologous chromosomes called synapsis starts. This pairing is highly specific and exactly pointed, but with no definite starting point(s). Each paired but not fused, complex structure is called tetrad.

25. What changes in cell take place during diplotene? **(4-times)**

Ans: The paired chromosomes repel each other and begins to separate. Separation however, is not complete, because homologous chromosomes remain united by their point of interchange. Each bivalent has at least one such point, the chromatids other wise separated.

26. What is importance of bivalent formation?

Ans: Due to bivalent formation of homologous chromosomes, the non sister chromatids exchange their segments during the crossing over resulting in new recombination.

27. What events occur in anaphase-I in meiosis? (3-times)

Ans: During the anaphase of meiosis -1 . The spindle fibres contract and each member of homologous chromosomes moves towards each pole. In this way half chromosomes reaches to one pole and other half reaches to another pole.

28. Name only stages of prophase I of meiosis.

Ans: Following are the sub stages of prophase I of meiosis

i. Leptotene ii. zygotene iii. Pachytene
iv. diplotene v. diakinesis

29. Discuss diakinesis in meiosis.

Ans: During this phase the condensation of chromosomes reaches to its maximum. At the same time separation of homologous chromosomes is completed, but still they are united at one point, more oftenly at ends. Nucleoli disappear.

30. Give main feature of metaphase of Meiosis -1. / What happens during metaphase. (2-times)

Ans: Nuclear membrane disorganizes. Spindle fibres originate and attached with Kinetochore of homologous chromosomes from each pole and arrange bivalent at equator.

Meiotic errors

31. Give causes and symptoms of Down 's syndrome. OR Write symptoms of Down's syndrome. / What is the causes and syptoms of Down's syndrome. (6-times)

Ans: The cause of Down's syndrome is the missing of 21st chromosomes due to non disjunction. The affected individuals have a flat, broad face, squint eyes with folds in the inner corner and protruding tongue, mental retardation and defective development of central nervous system.

32. Give the chances of occurrence of Down's syndrome in teenage mothers and a forty years old mother's offspring.

Ans The chances of teenage mother having down's syndrome child is one in many thousands of forty years old mother, one in hundred chances and by forty five the risk is three times greater.

33. Give only cause of Down's syndrome and Klinefelter syndrome.

Ans: These are meiotic errors due to non disjunction and due to unequal distribution of chromosomes.

34. Define non-disjunction of chromosomes. OR Define chromosomal non-disjunction. / What is non-disjunction of chromosomes? (4-times).

Ans: Meiotic error in which chromosomes fail to segregate during anaphase and telophase and do not finish with equal distribution of chromosomes among all the daughter nuclei is known as chromosomal none disjunction.

35. Give affects of XYY Klinefelter syndrome.

Ans: The affected persons are phenotypically male but have frequently enlarged breast, tendency to tallness, obesity, small testes with no sperms at ejaculation and under development of secondary sex characters.

36. Write symptoms of Turner's syndrome (3-times)

Ans: Individuals with this condition do not survive pregnancy and aborted. Those who survive have female appearance with short stature, webbed neck, without ovaries and complete absence of germ cells.

37. What is Klinfelter's syndrome?

Ans: The individual have an additional sex chromosome i.e., 47. (44 + xxy) . They are phenotypically male but have frequently enlarged breast, tendency to tallness, obesity, small testes with no sperms at ejaculation and under development of Secondary sex characters.

Necrosis and Apoptosis

38. What is apoptosis? **(3-times)**

Ans: The internal programme of events and sequence of morphological changes by which all cell commits suicide is called apoptosis.

39. How does cell death help in development of multicellular organisms? (3-times)

Ans: Programmed cell death help in proper control of multicellular organisms development, which may lead to deletion of entire structure (e.g., the tail of the developing human embryo) or a part of structure (e.g., tissues between developing digits). Cell death even controls number of neurons because most of the neurons in human body die during development.

40. Differentiate between necrosis and apoptosis. **(3-times)**

Necrosis	Apoptosis
Cell death due to tissue damage is called necrosis.	Internal programme of events and sequence of morphological changes by which cell commits suicide is collectively called apoptosis.

41. What changes occur in a cell during apoptosis?

Ans: During apoptosis the cell shrink and condensed ultimately split up thus release the small membrane bounded apoptotic bodies which are generally phagocytosed by other cells. Intracellular constituents are not released freely in extracellular environment which otherwise might have toxic effect.

42. What are the events of S-Phase?

Ans: Following $G_1$is the S-Phase (synthesis phase) during which the DNA is synthesized and chromosome number is doubled.

43. Write down the events of metaphase of mitosis.

Ans: The kinetochore fibers of spindles attach to the kinetochore region (specialized area in centromere) of chromosome and align them at the equator of the spindle forming equatorial plate or metaphase plate.

44. What are the events of zygotene of prophase-I of Meiosis?

Ans: First essential phenomenon of meiosis i.e, pairing of homologous chromosomes called synapsis starts. Each paired but not fused, complex structure is called bivalent or tetrad.

45. Write down the two functions of programmed death of a cell.

Ans: Programmed cell death helps in proper control of multicellular development which may lead to deletion of entire structure (e.g, the tail of developing human embryos) or part of structure (e.g tissue between developing digits).

46. How cytokinesis occur in plants?

Ans: At cytokinesis, in place of contractile ring a membrane structure, phragmoplast is formed from vesicle, which originates from Golgi complex. These vesicles lined up in the center of the dividing cell, where they fuse to form phragmoplast.The membrane of vesicles becomes the plasma membrane of daughter cells.

47. Write a brief note on turner's syndrome.

Ans: These infected individuals have one missing X chromosome with only 45 chromosomes (44 autosomes + X). Individuals with this condition often do not survive pregnancy and are aborted. Those who survive have female appearance with short stature, webbed neck, without ovaries and complete absence of germs cells.

2019

48. How meiosis plays its role in producing genetic variations?

Ans: Crossing over and random assortment of chromosomes are two significant happenings of meiosis. During crossing over, potential chromosmes exchange segemnts with each other which results in a large number of recombinations. At

the same time during anaphase the separation of homologous chromosomes is random, which gives very wide range of variety of gamets. Both these phenomena cause variations and modifications in the genome.

49. What changes occur in cell during metaphase of mitosis?

Ans: The kinetochore fibres of spindle attack to the kinetochore region of chromosome, and align them at the equator of the spindle forming equatorial plate or metaphase plate. Each kinetochore gets two fibers one from each pole.

50. Define crossing over and synapsis.

Ans: First essential phenomenon of meiosis, i.e, pairing of homologous chromosomes called synapsis starts.

Non – sister chromatids of homologous chromosomes exchange their segments due to chiasmata formation, during the process called crossing over. In this reshuffling of genetic material occurs which produces recombinations.

51. Define mitosis.

Ans: A type of cell division in which number chromosomes remains same in daughter cells as in parent cell and two daughter cell are formed from a single cell is called mitosis.

52. What changes occur in cell during anaphase of mitosis?

Ans: At anaphase the kinetochore fibers of spindle contract towards their respective poles, exert force and sister chromatids are separated from centromere. As a result, half sister chromatids travel towards each pole. At the same time polar microtubule elongates.

53. Define inter phase. Name its sub stages.

Ans: **Inter phase:** The period of life cycle between two consecutive divisions is called inter phase.

Its stages are G1 phase, S-phase, G2 phase.

54. Characterize pachytene in meiosis-I.

Ans: The pairing of chromosomes is completed. Chromosomes become more and more thick. Each bivalent has four chromatids, which wrap around each other. Non sister chromatids of chromosomes exchange their segments due to chiasmata formation, during the process called crossing over. In this way reshuffling of genetic material occurs which produce recombinations. Pachytene may last for days, weeks or even years.

55. Differentiate between G1 and Go phases of life cycle.

Ans:

G1 phase	G o phase
It is a period o extensive metabolic activity, in which cell normally grows in size, specific enzymes are synthesized and DNA base units are accumulated for the DNA synthesis.	Post mitotic cells can exit the cell cycle during the G1 entering a phase called Go, and remains for days weeks in some cases (e.g., nerve cells and the eye lens) even the life time of the organism without proliferating further.

56. Explain briefly prophase in mitosis.

Ans: At the start of prophase the chromatin appear as thin thread later on chromatin material get condensed. And chromosomes become more visible. Each chromosome become more is visible having two sister chromatids, attached at centromere. Towards the end of prophase nuclear envelope disappears and nuclear material is released in the cytoplasm, nucleoli disappear. Mitotic apparatus organized.

57. How malignant tumor or cancer is caused?

Ans: Cancer is caused mainly by mutations in somatic cell. Secondly cancer results from the accumulation of as few three to as many as twenty mutations in genes that regulate cell Davison.

The cells composing malignant tumor or cancer divide more rapidly spreading the cancer to other parts of the body.

58. Why inter phase is called resting phase?

Ans: The period of life cycle between two consecutive divisions is called inter phase it is misleadingly called resting phase but it is actually a period of great metabolic activities.

59. Give significance of meiosis.

Ans: Number chromosomes remain constant in a member of a species generation after generation as a result of meiosis.

New recombinations are formed as a result of crossing over in meiosis which provide raw material for evolution.

60. Define cell cycle and write name of its stages.

Ans: The cell under goes a sequence of changes, which involve period of growth, replication of DNA, followed by cell division. This sequence of changes is called cell cycle.

Two main stages of cell cycle are inter phase and mitotic phase.

61. Compare kinetochore microtubules and polar microtubules.

kinetochore microtubules	polar microtubules
Kinetochore microtubules attach to chromosomes at kinetochore. They help in the movement of chromosomes at the anaphase.	Polar microtubules do not interdigitate with polar microtubules from the opposite poles. They extend from one pole to another pole.

62. What is tedrad?

Ans: During zygotene of meiosis –I paring of homologous chromes takes place. Each pair but fused, complex structure is called tetrad because it has four chromatids in it.

63. Differentiate between inter phase and mitotic phase.

Ans:

Inter phase	Mitotic phase
The period of life cycle between two consecutive divisions is called inter phase.	The period of life cycle in which division takes place and daughter cells are formed.

LONG QUESTIONS OF CHAPTER-21 (CELL CYCLE) BOARD PAPERS-2011-21

1. Discuss in detail about malignant tumor or cancer. (4-times)
2. Write a note on prophase I of meiosis in animal cells.
3. Describe necroses and apoptosis in detail.
4. Define meiotic error. Explain Dawn's syndrome and klinfelter's.
5. Describe prophase I of meiosis.
6. Write a note on cancer. (2-times)
7. Give significance of meiosis. (3-times) (-times)
8. How does metaphase differ from anaphase of mitosis?
9. Compare mitosis with meiosis. Describe the importance of mitosis. (2-times)
10. What is meiosis? Elaborate the evens of prophase. (2-times)
11. Write a note on crossing over.

OBJECTIVE (MCQ'S) OF CHAPTER-22 (VARIATION & GENETICS) BOARD PAPERS-2011-21

Genes, Alleles and Gene pool

1. **Position of a gene on the chromosome is called its: (2-times)**

(A) Place (B) Habitat (C) Allele (D) Locus

2. **_______ is the, form of appearance of a trait.**

(a) Genotype (b) Phenotype (c) Pleiotropy (d) Epistasis

3. **Locus is a:**

(A) Part of DNA (B) Position of Gene (C) Partner of Gene (D) Complement of Gene

Law of segregation

4. **Mendelian factors were renamed as genes by:**

(A) Mendel (B) Correns (C) Johannsen (D) Morgan

Test cross

5. **This cross finds out the homozygous or heterozygous nature of the genotype:**

(a) Self cross (b) Back cross (c) Test cross (d) Dihybrid cross

Dominance Relations

6. **Incomplete dominance was discovered by 4'O clock plant in 1899 by:**

(a) Devries (b) Johanson (c) Carl Correns (d) Tscharmach

Multiple Alleles

7. **A man with blood group AB cannot be the father of a son who has blood group**

(a) O (b) AB (c) B (d) A

8. **The best example of inheritance of multiple alleles is: (2-times)**

(a) MN Blood type (b) Rh-Blood type (c) ABO Blood type (d) MNS Blood type

9. **The individuals, which are universal recipients, have (2-times)**

(a) A Blood group (b) B Blood group (c) AB Blood group (d) O Blood group

10. **ABO blood group system was discovered in 1901 by (5-times)**

(a) Punnet (b) Wiener (c) Bernstein (d) Landsteiner

11. **The universal donor blood group is (3-times)**

(a)A (b) B (c) AB (d) O

12. **ABO blood group system is encoded by a single polymorphic gene with (4-times)**

(a) Three multiple alleles (b) Four multiple alleles
(c) Five multiple alleles (d) Six multiple alleles

13. **ABO blood group system in man is encoded by a polymorphic gene I on chromosome: (3-times)**

(a)7 (b)9 (c)21 (d)x

Rh blood Group system

14. **The blood serum containing antibodies is called (3-times)**

(a) Antigen (b) Immunoglobulin (c) Plasma (d) Antiserum

15. **Rh blood group system is named after its:**
(a) Discoverer (b) Rhesus monkey (c) A patient (d) Rhinoceros

Epistasis and Bombay phenotype

16. **When a gene or gene pair at one locus, interferes with or hides the effect caused by another gene or gene pair at another locus, the phenomenon is called**
(a) Pleiotrophy (b) Epistasis (c) Codominance (d) Dominance
(2-times)

17. **Bombay phenotype is an example of:**
(A) Pleiotropy (B) Dominance (C) Probability (D) Epistasis

Continuously varying Traits

18. **The gene pairs which contribute to the wheat grains colour are: (2-times)**
(a) One (b) Two (c) Three (d) Four

19. **Human skin colour is a quantitative trait which is controlled by gene pairs:**
(2-times)
(a)2 to 4 (b)3 to 6 (c)4 to 6 (d)7 to 8
(2-time)

20. **The sex chromosomes were discovered by:**
(a) Sutton (b) Morgan (c) Jordan (d) Correns

Pattern of Sex determination

21. **A gamete without any sex chromosomes is called:**
(a) Autogamete (b) Gamete (c) Nullo gamete (d) Sex-gamete
(2-times)

22. ***Ascaris incurva* male has chromosomes:**
(a) 25 Chromosomes (b) 30 Chromosomes (c) 35 Chromosomes (d) 40 Chromosomes

Sex determination in Plants

23. **The genic system for determination of sex is present in:**
(a) *Gingko* (b) *Drosophila* (c) *Ascaris* (d) *yeast*

24. **The gene that triggers the developmental process towards maleness, is**
(a) tfm (b) SRY (c) MODY (d) BOB

Sex linkage (Sex linkage in *Drosophila*)

25. **Bobbed gene in *Drosophila* is present on: (3-times)**
(a) x chromosomes (b) y chromosomes (c) x and y chromosomes (d) Autosomes

26. **The gene causing the white eye trait in *Drosophila* resides only on the:**
(a) Autosome 3 (b) Autosome 7 (c) y- chromosomes (d) X-chromosomes

27. **Haemophilia C:**
(A) Affects both sexes equally (B) Affects men more than women
(C) Affects women more than men (D) Is non-allelic recessive sex-linked

Genetics of Colour blindness

28. **Green-colour blindness is called: (2-time)**
(a) Deuteranopia (b) Tritanopia (c) Tetranopia (d) Protanopia

29. **The true colour blindness is (2-times)**
(A) Monochromacy (B) Dichromacy (C) Trichromacy (D) Tetrachromacy

30. **Gene for blue opsin is present on chromosome number:**
(A) 19 (B) 09 (C) 11 (D) 07

31. **Deuteranopia is a colour blindness of:**

(A) Red (B) Blue (C) Green (D) Yellow

X-linked Dominant inheritance

32. **Hypophosphatemic rickets is an X- linked** **(4-times)**

(a) Codominant trait (b) Dominant trait (c) Over dominant trait (d) Recessive trait

Y-Linked inheritance

33. **Which trait is transmitted directly from an effected father to only his sons?**

(a) X-linked (b) Y-linked (c) Autosomal (d) X and Y linked

34. **A Y – Linked trait SRY on Y – Chromosome, determines** **(3-times)**

(a)Femaleness (b) Baldness (c) Maleness (d) Deafness

Sex limited traits

35. **A sex- limited trait is limited to only one sex due to** **(2-times)**

(a)Anatomical difference (b) Ecological difference

(c) Physiological difference (d) Taxonomic difference

Diabetes Mellitus and its genetic basis

36. **About 50% of cases of MODY are caused by mutation in:**

(a) Kinase gene (b) Galactoxinase gene (c) Hexo-isomerase gene (d) Glucokinase gene

2018

37. **A single gene with multiple phenotypic effect is describe as:**

(a) Co-dominance (b) Epistasis (c) Pleiotropy (d) Gene linkage

38. **All the genes found in a breeding population constitute:**

(a) genotype (b) Genome (c) Gene frequency (d) Gene pool

39. **Secretors have dominant secretor gene "Se" on chromosome:**

(a) 9 (b) 19 (c) 21 (d) 24

2019

40. **Trisomy of chromosome 18 is found in:**

(A) Down's syndrome (B) Patau syndrome (C) Edward syndrome (D) Jacob's syndrome

41. **The maturity on set diabetes of the young is:**

(A) An autosomal recessive trait (B) An autosomal dominant trait

(C) A sex linked trait. (D) A sex influenced trait

42. **The type of inheritance with same phenotypic and genotypic ratio, in F2:**

(A) Dominance (B) Incomplete dominance

(C) Epistasis (D) Co-dominance

43. **Hypophosphatemic rickets is an ________ trait.**

(A) X-linked (B) Y-linked (C) X and Y linked (D) An Autosomal

44. The cross which is used to find homozygous or heterozygous nature of genotype:

(A) Reciprocal cross (B) Monohybrid cross (C) Dihybrid cross (D) Test cross

45. If an offspring has its parental types 30+30 and recombinant types 20+20. What is the percentage of its recombination frequency.

(A) 20 (B) 40 (C) 60 (D) 80

46. A gamete without any sex chromosome is called:

(A) heterogamete (B) nullo gamete (C) nill gamete (D) homogamete

47. Separation of homologous chromosomes occurs during:

(A) prophase (B) metaphase (C) anaphase (D) telophase

2021

48- Keeping in view the Pod colour in Pea plant, the dominant colour is:

(A) Green (B) Yellow (C) White (D) Red

49- Maternal Foetal Incompatibility can result due to marriage between

(A) Rh^+ male and Rh^- female (B) Rh male and Rh^+ female

(C) Rh^+ male and Rh^+ female (D) Rh^- male and Rh^- female

50- Haemophilia 'C'

(A) Affects both sexes equally (B) affects men more than women

(C) aftects women more than men (D) is non-allelic sex linked recessive

51- The basic unit of biological information is called

(A) Locus (B) DNA (C) Gene (D) Inheritance

52- MN blood type is an example of:

(A) Codominance (B) Over dominance

(C) Incomplete dominance (D) Complete dominance

53- A person having neither antigen A nor B would have blood group:

(A) O (B) A (C) B (D) AB

54- In a dihybrid cross the probability of plant with wrinkled and yellow seeds in F2 is:

(A) 1/16 (B) 3/16 (C) 9/16 (D) 16/16

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14
D	B	B	C	C	C	A	C	C	D	D	A	B	D
15	16	17	18	19	20	21	22	23	24	25	26	27	28
B	B	D	C	B	B	C	C	D	B	C	D	A	A
29	30	31	32	33	34	35	36	37	38	39	40	41	42
A	D	C	B	B	C	A	D	C	D	B	C	B	A
43	44	45	46	47	48	49	50	51	52	53	54		
A	D	B	B	C	A	A	A	C	A	A	B		

SHORT QUESTIONS AND ANSWERS OF CHAPTER-22 (VARIATION & GENETICS) BOARD PAPERS-2011-21

Genes, Alleles and Gene pool

1. Differentiate between genotype and phenotype. (4-times)(2018)

Ans:

Genotype	Phenotype
Genotype is the genetic complement i.e the genes is an individual for a particular trait. e.g "RR" & "Rr" are alleles for red color. "rr" are alleles for white colour.	"Phenotype is the form of appearance of a trait in an organism". e.g Red and white flower colours are examples of phenotype.

2. What is beanbag genetics? Explain.

Ans: Beanbag genetics means that alleles are like a bean bag. The entire bean bag full of beans is the gene of the population. In the bean bag approach we can imagine the entire gene pool comprising all the alleles for all different traits at once, or we can just focus on some subset, such as all the alleles for a single trait.

3. Differentiate between homozygous and heterozygous.

Ans:

Homozygous	Heterozygous
If alleles of a gene pair are in similar form they are called homozygous	If the alleles of a gene pair are in different form they are called heterozygous.

4. Differentiate between dominant and recessive traits.

Ans:

Dominant trait	Recessive trait
The trait which is controlled by dominant gene or allele is called dominant trait.	The trait which is controlled by recessive gene or allele is called recessive trait.

5. Define gene and locus. OR What do you know about gene & locus? (2-times)

Ans: Gene is unit of inheritance. Or it may be defined as
The sequence of nucleotides which determines the amino acid sequence of a protein is called gene and the position of a gene on the chromosomes is known as locus.

6. What are Jumping genes? OR Define jumping genes. (2-times)

Ans: Jumping genes do not reside peacefully on their loci; they keep on hopping on different loci on the same chromosome or other chromosomes.

7. What is a true breeding variety?

Ans. A true breeding variety upon self fertilization always produced offsprings identical to their parents.

8. Differentiate between monohybrid and dihybrid cross.

Ans:

Monohybrid	Dihybrid
A cross between two organisms which differ only in one character is called monohybrid cross.	A cross between two organisms which differ only in two character is called dihybrid cross.

9. What is law of segregation? OR Define Mendel's law of segregation. (5-times)

Ans: The two coexisting alleles for each trait in an individual segregate from each other at meiosis, so that each gamete has only one of the two alleles. Alleles unite again at random fertilization of gametes when zygote is formed.

Test cross:

10. What is test cross? Give its significance? (4-times)

Ans: Test cross is a cross used to test the genotype of an organism showing dominant phenotype.

Significance of test cross is that we can know the genotype of an organism.

Law of independent Assortment:

11. Define probability (2-times)

Ans: It is the chance of an event to occur.

12. What is the product rule? (2-times)

Ans: "When two independent events are occurring simultaneously like in dihybrid cross, the ratio of each joint phenotypic combination can be obtained by multiplying the probabilities of individual phenotypes. It is called product rule".

13. State "Law of Independent Assortment" (2-times)

Ans: When two contrasting pairs of traits are followed in the same cross, their alleles are assorted independently into gametes.

Dominance Relations:

14. Define incomplete dominance, Give example

Ans: When the phenotype of the heterozygote is intermediate between phenotypes of the two homozygotes, it is called incomplete dominance. Example: flower colouring in 4'O clock plant.

15. Define co-dominance. (2-times)

Ans: Different alleles of a gene that are both expressed in a heterozygous condition are called co-dominant and the process is called co-dominance e.g MN blood group system.

16. What is dominance? Discuss over dominance. Give an example. (3-times)

Ans: Dominance is a physiological effect of an allele over its partner allele on the same locus.

Over dominance: This relation is very interesting because the over dominant heterozygote exceeds in quantity than phenotypic expression of both the homozygotes. In fruit fly *Drosophila* the heterozygote (W^+/w) has more quantity of florescent pigments in eyes than wild (w^+/w^+) or white eye (w/w) homozygote.

17. What is contribution of Carl Correns in genetics?

Ans: Carl Correns discovered the phenomenon of incomplete dominance.

He crossed red flowered 4 O'clock plant with white flowered 4O'clock plant. In F_1 pink flowers were produced instead of red as red color was dominant. He again crossed pink flowers from F_1, in F_2 red, pink white flowers obtained with ratio 1:2:1 respectively.

Multiple Alleles

18. What are multiple alleles, give its example? (4-times)

Ans: When a gene exists in more than two alternate forms called multiple alleles. Blood group ABO is an example of multiple alleles.

19. Differentiate between multiple alleles and polygenes.

Ans:

Multiple alleles	Polygenes
If a gene has more than two alternate forms these are called multiple alleles. For example alleles for ABO blood group. E.g., alleles for ABO blood group.	When a continuously varying trait is controlled by alleles of two or more than two different gene pairs found at different loci, all influencing the same trait in an additive way, such genes are called polygenes, e.g., genes for controlling skin and eye colour in human.

20. Why is blood group AB called as universal recipient?

Ans: AB blood group is called universal recipient because they have both A and B antigens but no antibodies, so they can easily accept or receive any type of blood group i.e., A,B,AB or O

Rh blood Group system

21. What is erythroblastosis foetalis? (2-times)

Ans: Due to maternal-fetal Rh incompatibility, there is destruction of fetal RBCs, and fetus become anemic,. The anemic fetus starts to release many immature erythroblasts into his blood stream. That is why this hemolytic diseases of new borne is called erythroblastosis foetalis.

22. How does ABO Incompatibility protect the developing baby against Rh-incompatiability?

Ans: Rh sensitization of Rh⁻ mother can be easily avoided if mother is given an injection of Rh antiserum during early pregnancy and immediately after birth.

Epistasis and Bombay phenotype

23. Compare between epistasis and poleiotropy. (2-times)

Ans:

Epistasis	Poleiotropy
When an effect caused by a gene pair on one locus interferes with or hides the effect caused by another gene or gene pair at another locus, it is called epistasis.	When a single gene affects two or more traits, the phenomenon is called pleiotropy.

24. What is Bombay Phenotype?

Ans: When in an individuals RBCs lack A and B antigens although they do not contain I^A and I^Bgenes. They are phenotypically like O blood group but are not genotypically like O. Their phenotype is called Bombay phenotype.

Pleiotropy

25. Define pleiotropy . Give two examples. (4-times)

Ans: When a gene controls more than one trait it is called pleiotropy. For example gene for eye colour in *Drosophila* also controls shape of spermathecae.

26. What is Pleiotropy? Give one example. (2-times)(2018)

Ans: When a single gene affects two or more traits the phenomenon is called pleiotropy. E.g.,genes that effect growth rate in human also influence both weight and height.

Continuously varying Traits

27. Differentiate between continuous and discontinuous variations.

Ans:

Continuous variations	Discontinuous variations
In Continuous variations many intermediate forms of a trait are present and organism show very small difference for a trait. For example skin color, eye color.	In discontinuous variations very sharp difference is present and no intermediate forms are present for a trait. For example tongue rolling, attached or free pinna.

28. Define polygenic inheritance. Give example. (2-times)

Ans: Polygenic inheritance is that which is controlled by more than two pairs of genes are called polyegneic traits. For example wheat grain color, human eye and skin color.

29. Describe the inheritance of skin colour in human. (3-times)

Ans: It is a quantitive trait which is controlled by three to six gene pairs. The greater the number of pigment specifying genes, the darker the skin colour. A child can have darker or light skin colour than his parents.

30. Differentiate between multifactorial and polygenic traits.

Ans:

Multifactorial traits	Polygenic traits
Traits which are controlled by many genes (polygenes) with combination of environment are called multifactorial traits.	The quantititive traits are called polygenic traits. These traits are controlled by more than two pairs of genes. Each polygene has small positive or negative effect on characters.

31. Differentiate between quantitative and qualitative variations.

Ans:

Quantitative variations/traits	Qualitative variations/traits
In qualitative variations difference is small and less striking. Many traits like skin color, height and weight exhibit continuous quantitative variation. /traits	In qualitative variations differences are large and more obvious, some traits like pea seed shape show discontinuous qualitative variation traits with two sharply distinct phenotypes like round and wrinkled.

Gene Linkage

32. Define linkage and give its one disadvantage. (2-times)

Ans: Phenomenon of staying together of all the genes of a chromosome is called linkage.

Its disadvantage is that, alleles cannot be assorted independently and no new recombinations are formed.

33. Differentiate between linkage and linkage group (3-times)(2018)

Ans:

Linkage	Linkage group
Linkage is a phenomenon in which all the genes on a chromosome stay together is called linkage.	The genes which are present on a chromosome form a block and these genes stay together is called linkage group.

Crossing over

34. Define recombination frequency. Give an example. (2-times)

Ans: It is the proportion of recombinant type between two gene pairs as compared to sum of all combinations.

35. How can you calculate frequency between two linked genes? / Write formula to calculate recombination frequency. (2-times)

Ans: Frequency between two linked genes can be calculated by the following formula

$$\text{Recombination frequency} = \frac{\text{Recombination type}}{\text{Sum of all combinations}} \times 100$$

36. What is tetrad?

Ans: Each pair of homologous chromosome which consists of four chromatids is called tetrad.

Sex determination (Sex chromosomes)

37. Differentiate between autosome and sex chromosomes. (4-times)

Ans:

Autosome chromosomes	sex chromosomes
Chromosomes which do not contain genes for sex determination or chromosomes other than sex chromosomes are called autosomes.	Chromosomes which play role in sex determination are called sex chromosomes.

38. Differentiate between homogametic and heterogametic organism. (2-times)

Ans:

Homogametic organism	Heterogametic organism
When an organism produce all the gametes of same type it is called homogametic.	If an organism produce gametes of different type it is called heterogametic.

Pattern of Sex determination

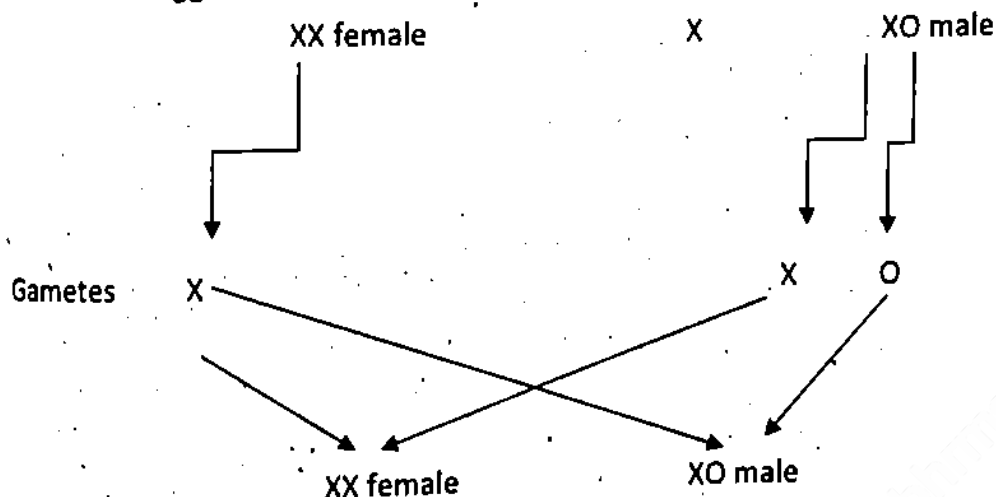
39. In birds, the female is heterogametic. How?

Ans: In birds female is heterogametic because she produces two different types of gametes and sex of new borne is determined by the type of female gamete which fertilize the sperm.

40. What is nullo gametes?

Ans: A gamete without sex chromosome is called nullo gamete. For Example, Grasshopper male produce 50% nullo gametes and 50% with sex chromosomes.

41. What is XO— XX mechanism of sex determination?

Ans: This pattern of inheritance is found in grasshopper and *Protenor bug*. Male is XO because male has one x chromosome., the other x chromosome is missing and female is XX , it is homogametic because it forms all gametes of same type with one X chromosome. Male is heterogametic because it forms two types of sperms: half sperms have X chromosomes and other half are without X chromosomes. When sperm with X chromosome is fused with an egg having X chromosomes female offspring is produced and when sperms without X chromosome is fused with egg then male offspring will be produced.

Sex determination in Plants

42. Explain genic system for determination of Sex. / What is genic system for determination of Sex. **(2-times)**

Ans Many species of eukaryotic micro-organisms like yeast do not have sex chromosome. These depend on genic system for determination of sex. In this system the sexes are specified by simple allelic differences at small number of gene loci.

43. How sex is determined in yeast?

Ans: Sex determination in yeast depends upon genic system. In this system the sexes are determined by simple allelic difference at a small number of gene loci e.g., a and α are the two mating types or sexes of yeast controlled by MAT a and MAT α alleles respectively.

Sex linkage (Sex linkage in Drosophila)

44. Define SRY gene. **(2-times)**

Ans: SRY stands for sexual determining region of Y. It is the part of Y–chromosomes in human males which is responsible for male characters or maleness.

45. Assign the sex of the human having XO , XXX , XXY and XYY chromosomes.

Ans:

Species	XX	XY	XO	XXY
Human	Female	Male	Male	Male
Drosophila	Female	Male	Female	Female

Sex linkage in human and Haemophilia

46. Define product rule and pseudoautosomal genes.

Ans: The genes which are located both on x and y chromosomes are called x and y linked genes or pseudoautosomal genes because their pattern of inheritance is like autosomal genes.

Product rule: When we multiply probabilities of two different event, this phenomenon is celled product rule.

47. What is Haemophilia? Give its types. (2-times)

Ans: Haemophilia is rare x-linked recessive trait. Haemophilic's blood does not clot properly after an injury, because it has either a reduction or malfunction or complete absence of blood clotting factor.

Its types are Haemophilia A, haemophilia B and haemophila C.

48. Two normal parents have an albino child. What is the probability that their next child will also be an albino?

Ans: 3 of their sons will be normal and one will be albino that is the ratio is

Normal : Albino

3 : 1

Genetics of Colour blindness

49. Differentiate between tritanopia and deuteranopia.

Ans:

Tritanopia	Deuteranopia
Tritonopia is blue colour blindness.	Deuteronopia is green blindness.

50. What is monochromacy?

Ans: Monochromacy means only one colour can be perceived by the colour blind person. Monochromacy is true colour blindness.

51. What do you know about protanopia and tritanopia?

Ans: Protonopia is red color blindness while tritonopia is blue color blindness.

52. Explain testicular feminization syndrome. (3-times)

Ans: Testicular feminization syndrome is a rare X linked recessive trait. Although the persons affected by this trait have a set of XY chromosome. Yet tfm gene on their X chromosome develops them physically into females. They have breast, female genitalia, a blind vagina but no uterus, degenerated testis are also present in abdomen. Such individuals are happily married as females but are sterile. It is an androgen insensitivity syndrome. Male sex hormone testoterone has no effect on them.

X-linked Dominant inheritance

53. What is hypophosphatemic rickets?

Ans: It is an X linked dominant trait. It is rare hereditary disease. It does not result from vitamin D deficiency but its cause is a genetic communication failure at molecular level. The genes encoding bone proteins never receive vitamin D message to function.

Sex limited traits

54. What are sex limited traits? Give an example. (2-times)

Ans: Sex limited traits are present only in one sex due to anatomical differences. Such trait affects a structure or function of the body present in only males or only females. For example genes for milk yield in dairy cattle affect only cows.

Sex-influenced traits

55. What are sex influenced traits? Give an example. (2-times)(2018)

Ans: Sex influencing traits occurs in both males and females but more common in one sex. It is controlled by an allele that is dominant in one sex but recessive in other. This difference in expression is due to hormonal difference in two sexes. E.g., patteren baldness is sex influenced trait.

56. A man is 45 years old and bald. His wife also has pattern baldness. What is the risk that their son will lose his hair?

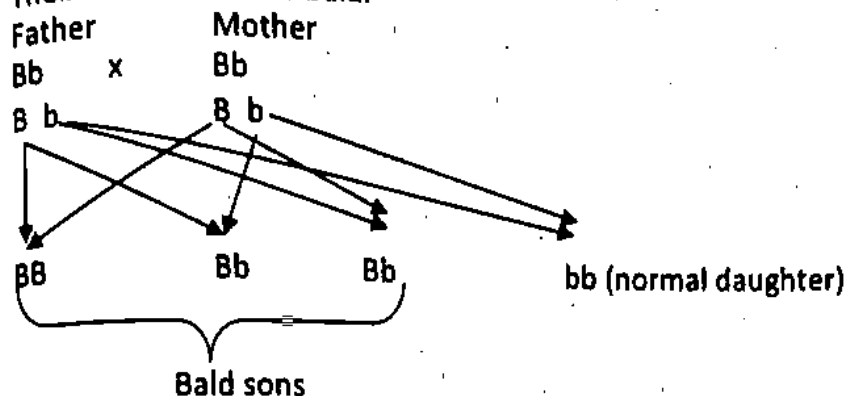
Ans: Their son will also be bald.

Father x Mother

Bb x Bb

B b B b

BB Bb Bb bb (normal daughter)

Bald sons

Diabetes mellitus and its genetic basis

57. What is MODY? Write its causes. Explain the term MODY. (4-times)

Ans: About 2 to 5% of type II diabetics get the disease early in the life before 25 year of age. It is called maturity onset diabetes of the young (MODY). MODY can be inherited as an autosomal dominant trait.

58. What is type II diabetes or NIDDM?

Ans: Type II diabetes or NIDDM. It account for 90% of all diabetic patients. These person produce some endogenous insulin themselves, but their body cells fail to respond to insulin and cannot take up glucose from blood. They develop some sort of insulin resistance.

59. Differentiate between co-dominance and over-dominance.

Ans:

Co-dominance	Over-dominance
Different alleles of a gene that are both expressed in a heterozygous condition are called codominant and this phenomenon is called codominance. e.g If a man of M blood group marries a woman of N blood group, all their children will have MN blood group.	This dominance relation is fascinating because the overdominant heterozygote exceeds in quantity the phenotypic expression of both the homozygotes. e.g. In fruit fly *Drosophila* the heterozygote W^+/w has more quantity of fluorescent pigment in eyes than wild W^+/w has more quantity of fuorescent pigment in eyes than wild W^+/w or white eye w/w homozygotes.

60. Differentiate between genotype and phenotype. (2 times)

Ans:

Phenotype	Genotype
Phenotype is the form of appearance of a trait.	Genotype is the genetic compliment i.e., the genes in an individual for a particular trait.

61. Differentiate between Complete Dominance and Co-dominance.

Ans:

Complete dominance	Co-dominance
Dominance is a physiological effect of an allele over its partner allele on the same gene locus. When one allele (R) is completely dominant over the other (r) presence of the recessive allele is functionally hidden, so the	Different alleles of a gene that are both expressed in a heterozygous condition are codominant & this phenomenon is called codominance. Each allele of the gene pair is associated with a different substance e.g. Allele $A_1 \xrightarrow{produce}$ substance X

heterozygote (Rr) has the same round phenotype as RR homozygote pea seeds.	Allele $A_2 \xrightarrow{produce}$ substance Y Codominance occurs when both the alleles express in heteterozygote (A_1A_2) & form their respective products X & Y. The codominant would have both the substances at the same time. e.g MN blood type or blood group system.

62. Differentiate between gene and allele. / Define gene and allele. **(6-times)**

Ans:

Gene	Allele
Gene is the basic unit of biological information. In fact DNA stores all storts of biological information coded in the sequence of its bases in a linear order and genes are actually parts of DNA comprising its base sequences.	Genes form pairs on pairs of homologous chromosomes. One member of a gene pair is located on one homologue and the other member on other homologue. Partners of a gene pair are called alleles.

63. Define Test Cross. Give its importance. Define Test Cross. **(2 times)**

Ans: Mendel devised a cross called test cross, which is used to test the genotype of an individual showing a dominant phenotype. It is a mating in which an individual showing a dominant phenotype is crossed with an individual showing its recessive phenotype. Significance of test cross is it is used to check the homozygosity & heterozygosity of the dominant parent.

64. Differentiate between population & gene pool.

Ans:

population	gene pool
"Any group of interbreeding organisms of the same species that exist together in both time and space is called a population". e.g. 100 diploid plants of pea in a field is an example of population.	"All the genes or alleles found in a breeding population at a given time are collectively called the gene pool". e.g. pea plant has white colors. There will be 100 genes (or 200 alleles) for flower color in gene pool.

65. What is epistasis? How it differs from dominance? **(2 times)**

Ans:

Epistasis	Dominance
An effect caused by a gene or gene pair at one locus interferes with or hides the effect caused by another gene or gene pair at another locus, such a phenomenon of gene interaction is called **epistasis.** Epistasis must not be confused with dominance.	Dominance is the relationship between alleles of the same gene occupying the same locus, but epistasis is the interaction between different genes occupying different loci.

66. How sex is determined in plants?

Ans: Plants show a variety of sexual situations. Some species like *Ginkgo* are dio-ecious having plants of separate sexes. Male plants produce flowers with only stamens and female plants produce flowers with only carpels. Some dioecious plants have a difference of sex chromosomes between the sexes. These have an X – Y system. These plants typically exhibit an X – choromosome – autosome balance system for sex determination.

67. **Define gene linkage and gene linkage groups.**

Ans:

Gene linkage	Gene linkage groups
Gene linkage is the tendency of DNA sequences that are close together on a chromosomes to be inherited together during the meiosis phase of sexual reproduction.	In genetics all of the genes on a single chromosome are inherited as a group i.e during cell division they act and move as unit rather than independently.

68. **What is heterogametic individual? Give example.**

Ans: Male grasshopper is XO because it has only one X chromosome. The other sex chromosome is missing entirely. Male is heterogametic because it forms two type of sperms, half the sperms have X chromosome while the other half are without any sex chromosome.

69. **Give significance of test cross.**

Ans: Mendel devised a cross called test cross, which is used to test the genotype of an individual showing a dominant phenotype. This cross finds out the homozygous or heterozygous nature of the genotype.

2019

70. **Differentiate between point mutation and chromosomal aberrations.**

Ans:

Point mutation	Chromosomal aberrations
Point mutations are mutational changes which effect the message itself producing altrations in the sequence of DNA nucleotide. If altrations involve only one or a few base pairs in the coding sequence they are called point mutations.	Chromosomal aberrations are megachanges which involve presence of an extra chromosome or loss of a chromosome from the diploid number of chromosomes or changes like deletions, insertions, inversions etc in the part of chromosome.
Example: ➢ Sickle cell anemia ➢ Phenylketonuria	Example: ➢ Down's syndrome. ➢ Klinefelter's syndrome

71. **What is diabetes, name its types?**

Ans: Diabetes mellitus is a hereditary disease. It is actually a heterogeneous group of disorders which are characterized by elevated blood sugar level.

There are two major types of diabetes:

a. Type I is IDDM or insulin dependent diabetes mellitus.
b. Type II is NIDDM or non insulin independent diabetes mellitus.

72. **What do you know about monohybrid and dihybrid crosses?**

Ans: After establishing 14-breeding lines of seven characters. Mendel cross-fertilized plants that differed in one character only. The offspring of such a cross were called monohybrids. He cross-fertilized a true breeding round-seeded male plants with a true breeding wrinkles seeded female plant.

A dihybrid cross describes a mating experiment between two organisms that are identically hybrid for two traits. A hybrid organism is one that is heterozygous which means that is carries two different alleles at a particular genetic position or locus. For example seed shape and seed colour of pea plants.

73. **What do you know about "Epistasis"?**

Ans: When an effect caused by a gene or gene pair at one locus interferes with or hides the effect caused by another gene or gene pair at another locus, such a phenomenon of gene interaction is called epistasis e.g Bombay phenotype.

74. What are "Polygenic Traits"? give an example from human beings.

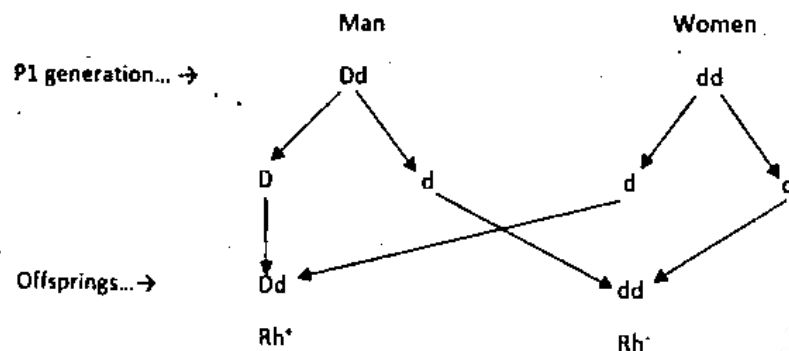
Ans: A continuously varying trait is excoded by alleles of two or more different gene pairs found at different loci, all influencing the same trait in an additive way. These quantitative traits are called polygenic traits.

Examples: Human skin colar is also a quantitating trait which is controlled by three to six gene pairs. The greater number of pigment specifying genes, the darker the skin. A child can have darker or lighter skin than his parents.

75. What are compound sex chromosomes? Give an example.

Ans: The X-X chromosome is made up of an inverted X chromosome, with the short arm of the Y chromosome attached to the free end of the X and the long arm of the Y forming a second arm of the chromosome. In compound chromosomes homologous chromosomes arms are attached to the same centromere....... For example.diplo-2 eggs arising from mondisjunction will give rise to euploid zygotes if they are fertilized by nullo-2 sperm produced by males carrying compound autosomes and vice versa.

76. An Rh^- woman is married to an Rh^+ man whose father was also Rh^-. What is the probable risk of erythroblastosis. Foetalis in their babies.

Ans:

Result: The possible risk of erythroblastosis foetalis among offsprings is ½ or 50%.

77. Define crossing over. Give its importance.

Ans: Crossing over is an exchange of segments between non sister chromatids of homologous chromosomes during miosis. It give recombination in chromosomes during gamete formation which brings variations and make individual specific, particular and unique in his characters.

78. What is a multifactorial trait? Give an example.

Ans: Multifactorial inheritance means that many factors (multifactorial) are involved in causing a health problem. The factors are usually both genetic and environmental. A combination of genes from both parents plus unknown environmental factors make the trait or condition. An example of a multifactorial trait is human height.

79. In grasshoppers male has 23 chromosomes, while female has 24 chromosomes. Work out.

Ans: In some grasshoppers males and females have different number of chromosomes. The female has 24 chromosomes in form of 11 pairs of autosomes and a pair of x chromosomes. But the male grasshopper has 23 chromosomes. He has 11 pairs of autosomes and only one x chromosome. The other member for sex chromosome pair is entirely missing in male. Thus male is XO and female is XX.

2021

80. **Differentiate between linkage and crossing over.**

Ans:

Crossing over	Linkage
It is segmental exchange between the non sister chromatids of homologous chromosomes	Phenomena of staying together of linked genes is called linkage.

81. **What are sex linked recessive traits? Why men are more vulnerable than women?**

Ans: Sex linked recessive trait is atrait that is determined by an X-linked recessive gene. Men are more vulberable than women because in male only one recessive allele on X- chromosomes while in women two recessive alleles on two X chromosomes are required for x linked recessive traits.

82. **What is erythroblastosis foetalis? How it is treated after birth?**

Ans: Due to Rh blood incompatibility the RBC destruction started in the fetus and fetus become anemic. The anemic fetus starts to release immature erythrocytes in his blood serum. That is why this hemolytic disease of new born is called erythroblastosis foetalis.

Treatment: Rh sensitization of Rh^- mother is avoided by simple therapy. Mother is given an inhection of Rh antiserum during early pregnancy and immediately after birth. The Rh –antibodies in the Rh antn serum will destroy the Rh^+ RBC of fetus before they stimulate production of maternal anti – Rh antibodies.

83. **What is complete dominance?**

Ans: If an allele completely masks the effect of its partner allele then it is called complete dominance. For example yellow seed colour (RR) is completely dominating the green (rr) seed colour.

84. **Define gene linkage. How does gene linkage affect variations among the offspring?**

Ans: It is the phenomena in which linked gene remain together. Linked genes do not show independent assortment so the chance of variation among the offspring are reduced.

85. **Enlist antibodies found in A, B, AB and O blood groups.**

Ans:

Blood group	Antigens
A	A
B	B
AB	A & B
O	None

86. **What are secretors?**

Ans: A and B antigens can also be present in saliva and other body fluids of some persons called secretots. Secretors have dominant secretor gene "Se" on chromosome no 19.

87. **Compare allele with multiple alleles.**

Ans:

Alleles	Multiple alleles
Partner of gene pair is called alleles	Alternate form of genes whose number is more than two are called multiple alleles. E.g. Alleles for blood group.

88. Give any two adverse effects of maternal foetal Rh compatibility.

Ans: Rh Incompatibility may leads to abortion or still birth. Even if pregnancy continues, the liver and spleen of the fetus swell as they rapidly produce RBC. The breakdown product of RBCs is called bilirubin also accumulate in the fetus. Bilirubin damages his brain cells and in turn his skin and whites of eye yellow. This condition is called anemia.

89. How linked genes can be separated? How many linkage groups on human chromosome 11?

Ans: Linked genes can be separated by crossing over.

Linkage group on chromosome no 11 has gene for sickle cell anemia, leukemia, and albinism.

90. What are autosomes? How many autosomes are present in grass hopper?

Ans: Autosomes: the chromosomes other than sex chromosomes are called autosomes. Grass hopper has 11 pairs of autosomes.

91. Enlist types of colour blindness.

Ans: Types of colour blindness are

Protanopia (red blindness)

Deuteranopia (green blindness)

Tritanopia (blue blindness)

92. What is universal blood donor?

Ans: Persons with blood group are called universal donor because they do not have any antigens and they can donate blood to every type of blood group.

93. What are opsins?

Ans: Each type of cone cells in the eyes has specific light absorbing proteins called opsin.

The genes for red and green opsins are on X - chromosomes while for blue opsin are present of chromosome no 7.

LONG QUESTIONS OF CHAPTER-22 (VARIATION & GENETICS) BOARD PAPERS-2011-21

1. Explain sex determination in plants.
2. Compare chromosomal determination of sex between *Drosophila* and humans.
3. Discuss genetics of color blindness.
4. Explain Diabetes mellitus and its genetics basis.
5. How sex is determined in man and grasshopper?
6. What is Rh-factor? Describe its role in pregnancy and blood pressure.(3-times)
7. What is Mendel's law of segregation? Illustrate it with an example (2-times)
8. Discuss Mendel's law of independent Assortment. (2-times)
9. What is incomplete dominance? Explain it with an example.
10. Discuss the genetic of ABO blood group system. (3-times)
11. Write a note on codominance with an example. (2-times)

2016

12. Discuss MN-Blood group types system in detail.
13. Define erythroblastosis foetails. Explain maternal-fetal Rh-incompatibility.
14. Discuss Rh blood group system in man.
15. Discuss sex-linkage in humans with one example.
16. Define epistasis and explain it with bombay phenotype.
17. Describe the phenomenon of gene linkage.
18. Explain XO –XX and ZZ – ZW types of sex determination.

OBJECTIVE (MCQ'S) OF CHAPTER-23 (BIOTECHNOLOGY) BOARD PAPERS-2011-21

Introduction, Cloning of a Gene & Recombinant DNA Technology

1. **Recombinant DNA is introduced into the host cell by means of:**
(a) Vector (b) Phage (c) Bacterium (d) Fungus

2. **In which year Hamilton O. Smith, at John Hopkins University, Isolated the first restriction Enzymes?** **(2-times)**
(a)1965 (b)1970 (c)1975 (d)1980

3. **Gene of interest is joined to the open ends of plasmid by:**
(a) DNA ligase (b) DNA polymerase (c) RNA polymerase (d) Helicase

4. **Commonly used restriction enzyme is:**
(a) Plasmid (b) p^{SC} 101 (c) p^{BR} 322 (d) *Eco.* R1

5. **$P^{sc}{}_{101}$ has antibiotic resistance gene for** **(2-times)**
(a)Tetracycline (b) Ampicillin (c) Neomycin (d) Ergotine

6. **It makes the bacterial cell more permeable to take up recombinant plasmids:**
(a) Sodium chloride (b) Cesium chloride (c) Calcium chloride (d)Potassium chloride

7. **Plasmid p^{BR} 322 has antibiotic resistance gene for:**
(A) Tetracycline (B) Ampicillin
(C) Tetracycline and ampicillin (D) Penicillin

8. **EcoR1, is a commonly used:**
(A) Gene (B) Restriction enzyme (C) Bacteriophage (D) Bacteria

9. **The enzymes which are used to cut the gene of interest are known as:**
(A) DNA polymerase (B) RNA polymerase
(C) Restriction endonucleases (D) DNA ligase

10. **First restriction enzyme was isolated by:** **(2-times)**
(A) Kary Mullis (B) Hamilton (C) Sanger (D) Mendel

Genomic Library

11. **The entire collection of bacterial or bacteriophage clones that contains all genes of those organisms is called: (2-times)**
(a) Gene bank (b) Gene book (c) Gene pool (d) Genomic Library

The polymerase chain reaction

12. **DNA polymerase enzyme was isolated from:** **(2-times)**
(a) Bacteria (b) Viruses (c) Fungi (d) Protozoa

13. **The polymerase chain reaction was developed in 1983 by** **(3-times)**
(a) Kary B. Mullis (b) Gottlieb haberlandet
(c) Theodore M. Klein (d) J. Craig venter

14. **Taq polymerase is obtained from** **(2-times)**
(a) Fungus (b) Algae (c) Becterium (d) Virus

15. ***Thermus aquaticus* is a/an**
(a) Fungus (b) Protozoan (c) Alga (d) Bacterium

Analyzing DNA

16. Genome fragments can be separated according to their lengths during the process:
(A) Cataphoresis (B) PCR (C) Cloning (D) Gel electrophoresis

Biotechnology products (Transgenic bacteria)

17. Aspartame is a: (2-times)
(a)Monopeptide (b) Dipeptide (c) Tripeptide (d) Polypeptide

18. Which of these would you except to be a biotechnology product?
(a) Vaccine (b) DNA probe (c) Protein (d) Steroid

Transgenic plants

19. Polyhydroxy butyrate is called:
(a)Antithrombin III (b) Nutra sweet (c) Biodegradable plastic (d) Luciferine

20. Antibodies made by soybean are used to cure: (2-times)
(a) Tumor cells (b) Mumps (c) Genital herpes (d) Cystic fibrosis

Transgenic animals

21. Antithrombin III is a biotechnological product produced by:
(A) Sheep (B) Goat (C) Mice (D) Cow

22. The use of transgenic farm animals to produce pharmaceutical is termed as:
(A) Gene therapy (B) Genetic drift (C) Gene farming (D) Gene pharming

23. Urine is preferable vehicle for a biotechnology product than:
(A) Milk (B) Blood (C) Plasma (D) Tissue fluid

Cloning of transgenic Animals

24. The cells which cling to an egg after ovulation are called:
(a) Cumulus (b) Ovary cells (c) Heap (d) Plethora

Gene therapy

25. Cystic fibrosis patients lack a gene that codes for transmembrane carriers of: (3-times)
(a) Sulphate ions (b) Carbonate ions (c) Chloride ions (d) Bromide ions

26. Persons with Huntington's disease have a unique site where a restriction enzyme cuts:-
(a) DNA (b) RNA (c) Lipids (d) Proteins

Tissue culture

27. The advantage of meristem culture is that meristem, unlike other portions of the plant is free of (2-times)
(a)Protozoans (b) Viruses (c) Fungi (d) Becteria

28. Cell suspension cultures of *Digitalis lanata* produces (3-times)
(a) Anti-toxin (b) Digitoxine (c) Polludrin (d) Quinine

29. Tissue culture and cloning seek help through:
(A) Mitosis (B) Endomitosis (C) Meiosis (D) Karyokinesis

30. The coconut milk contains the plant hormone called:
(A) Auxin (B) Cytokinins (C) Gibberellins (D) Abscisic acid

Genetic engineering of plants

31. Adult transgenic tobacco plants glowed when sprayed with the substrate:
(a)Luciferon (b) Luciferin (c) Luciferol (d) Luciferase

32. *Arabidopsis* is:
(A) Heat resistant (B) Water absorbent (C) Totipotent (D) Salt tolerant

Agriculture plants with improved traits

33. A team of Japanese scientists is attempting to introduced the C_4 photosynthetic cycle into (3-times)
(a)Wheat (b) Rice (c) Corn (d) Oat

2018

34. An enzyme α – galctosidase that can be used to treat a human lysosome storage disease, is harvested from:
(a) Soyabeans (b) Tobacco plants (c) Sugarcane (d) Corn plants

35. Patients of cystic fibrosis often die due to numerous infections of the:
(a) Digestive tract (b) Excretory tract (c) Respirtory tract (d) Reproductive tract

36. A collection of bacterial and phage viruses clones containing a particular segment of DNA from the source cell is called:
(a) Recombinant DNA (b) Expressing system (c) Genomic library (d) Genome

37. Primer for PCR contains about:
(a) 05 bases (b) 10-20 bases (c) 30 bases (d) 40 bases

38. How many base pairs are found in the human genome?
(a) three billion (b) five billion (c) thirty billion (d) forty billion

2019

39. The enzyme luciferase is produced in an insect called:
(A) Housefly (B) Firefly (C) Butterfly (D) Tsetsefly

40. Which enzyme acts as molecular scissors?
(A) DNA polymerase (B) RNA polymerase
(C) Restriction endonuclease (D) DNA gyrase

41. The organisms used as biofilters is:
(A) Transgenic plant (B) Transgenic animal (C) Transgenic bacteria (D) Transgenic virus

42. Adult transgenic tobacco plant glowed when sprayed with substrate:
(A) Luciferin (B) Luciferol (C) Luciferase (D) Luciferous

43. Transgenic bacteria are produced in large vats called:
(A) transducer (B) bioreactor (C) biomultiplier (D) culter media

44. The phenomena in which transfer of genetic material from one cell to another and can alter the genetic make up of the recipient cell is:
(A) translocation (B) translation (C) transduction (D) transformation

2021

45- A genome is a full set of genes of:
(A) Community (B) Population (C) Individual (D) Biosphere

46- Bacterial Cells take up recombinant plasmid if they are treated with:
(A) Calcium Chloride (B) Sodium Chloride
(C) Ammonium Chloride (D) Barium Chloride

47- Organisms that have a foreign gene inserted into them are called
(A) Genome (B) Transgenic (C) Bioreactor (D) Nutrasweets

48- Plasmids were discovered while studying the sex lift of:
(A) E. Coli (B) Hyphomicrobium (C) Vibriofi (D) Mycobacterium

49- A gene is synthesized in laboratory from mRNA using:
(A) Reverse transcriptase (B) DNA polymerase (C) Transcriptase (D) RNA polymerase

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	B	A	D	A	C	C	B	C	B	D	A	A	C
15	16	17	18	19	20	21	22	23	24	25	26	27	28
D	D	B	A	C	C	B	D	A	A	C	A	B	B
29	30	31	32	33	34	35	36	37	38	39	40	41	42
A	B	B	D	B	B	C	C	B	A	B	C	C	A
43	44	45	46	47	48	49							
B	D	C	A	B	A	A							

SHORT QUESTIONS AND ANSWERS OF CHAPTER-23 (BIOTECHNOLOGY) BOARD PAPERS-2011-21

Introduction, Cloning of a Gene & Recombinant DNA Technology

1. What is Genome?

Ans: A complete set of chromosome which is haploid in number is called genome or a full set of genes of an individual is called genome.

2. Write the way by which bacterial cells become permeable of plasmid.

Ans: Calcium chloride is used to increase the permeability of bacterial cell for plasmid. **(2-times)**

3. Define plasmid. Give its uses.

Ans: Plasmids are natural extra chromosomal circular DNA molecules which carry genes for antibiotic resistance and fertility etc.,
Plamids are used as vector to insert desire gene into bacterial or host cell.

4. Define biotechnology. Name two biotechnology products. (4-times)

Ans: It is a technology in which chemical processes of living organisms can be used for the welfare of mankind. Its products are Insulin, growth homones.

5. What are transgenic organisms? (2-times)

Ans: Organisms having foreign DNA or gene in addition to its own DNA are called transgenic organisms.

6. Give three possible ways to get the gene of interest. OR Write three methods to get gene of interest. (5-time)

Ans: Gene of interest can be obtained by following methods
- i. To isolate it from chromosomes
- ii. Make it from mRNA
- iii. Synthesize it chemically

7. What are restriction enzymes? Give an example. (7-times)

Ans: The restriction enzymes cut down the viral DNA, but does not harm to the bacterial cell. They are called restriction enzymes because they restrict the growth of virus. *ECORI* is commonly used restriction enzyme.

8. Elaborate molecular carriers. Give example.

Ans: Bacterial plasmids are called molecular carriers because they carry the gene of interest to the host cell.

9. What steps are involved to produce recombinant DNA? (2 times)

Ans: Steps of recombinant DNA technology are
- i. To get gene of interest which is to be cloned
- ii. Restriction enzyme to cut desired gene and plasmid
- iii. Vectors (plasmids) in which gene of interest could be placed
- iv. The gene of interest along with the vector is then introduced into an expression system as a result of which a specific product is made.

10. What is recombinant DNA?

Ans: When DNA of two different organisms is combined it is called recombinant DNA or when the two different DNA are joined together it is called recombinant DNA/ chimeric DNA.

Transgenic organisms: The organisms having foreign DNA inserted in to them are called transgenic organisms

11. What is recombinant DNA technology?

Ans: It is a technique by which DNA of one organism can be transferred to another organisms and recombinant DNA is made.

12. What are palindromic sequences? Give their significance (4-times)

Ans: Nucleotide sequence that is identical to its complementary strand when each is read in the same chemical direction for example GATC

Significance of palindromic is that it help us to extract patterns in genomic sequence.

13. What do you know about recombinant DNA technology?

Ans: In DNA recombinant technology the DNA of one organism can be entered in to another organism. Thus recombinant DNA technology can be used to make many biotechnology products and can be used for the treatment of many genetic diseases and to improve the traits of many plant and animal species.

Genomic Library

14. How a certain gene can be searched present in a genomic library?

Ans: A particular probe can be used to search particular sequence of gene in the genomic library. A probe is a single stranded nucleotide sequence that will hybridize into a certain piece of DNA. Location of the probe is possible because probe either is radioactive or fluorescent.

15. What is Probe? Give its one use. OR What is probe? How is it traced? (4-times)

Ans: A probe is a single stranded nucleotide sequence that will hybridize into a certain piece of DNA. Position of probe is possible because the probe is either radioactive fluorescent.

16. Define genomic library, how it can be made?

Ans: A genomic library is a collection of bacterial or bacteriophage clones, each containing a particular segment of DNA from the source cell.

For making genomic library, an organism's DNA is simply sliced up into pieces and pieces are put into vectors that are taken up by the host bacteria. The entire collection of bacterial or bacteriophage clones that result contains all the genes of that organisms.

17. Differentiate between genome and probe.

Ans:

Genome	Probe
A complete set of chromosome which is haploid in number is called genome or a full set of genes of an individual is called genome.	A probe is a single stranded nucleotide sequence that will hybridize into a certain piece of DNA.

The polymerase chain reaction

18. What is taq polymerase and its significance? (3-times)

Ans: Taq polymerase is an enzyme which is used in PCR. Its significance is that it can withstand with high temperature.

19. What is polymerase chain reaction?

Ans: It is a process by which millions of copies of a single gene or any specific part of DNA can be made quickly in test tube. PCR is very specific and targeted DNA Sequence can be less than one part in a million of the total DNA sample.

20. Give briefly the application of PCR amplification and analysis.

Ans: Applications of PCR amplification and analysis are

i. To diagnose viral infections, genetic disorders and cancer
ii. In forensic labs to identify criminals
iii. To determine evolutionary history of human

21. Write two uses of PCR. (2 times)

Ans: i. It is used to make or clone of a gene.

ii. PCR used for the purpose for diagnosis and monitoring of genetic diseases.

iii. It is also helpful in identification of criminals and functions of targeted segments of DNA.

Analyzing DNA

22. Give any two uses of PCR amplifications and analysis (4-times)

Ans: It can be used to diagnose viral infection, genetic disorders and cancer

It can be used in forensic labs to identify criminals.

(2-times)

23. What is DNA finger printing? Give its uses.

Ans: It is a technique in which entire genome of an individual can be subjected to DNA analysis by gel electrophrasis.

It can be used to identify the culprits.

Problems of disputed parenthood can be solved by this method.

24. What is gel electrophoresis? OR Define gel electrophoresis. **(2-times)**

Ans: It is a process by which fragments of DNA can be separated according to their lengths or size and the result is a number of bands that are so close together that they appear as a smear.

Gene sequencing

(2-times)

25. Explain the importance of gene sequencing.

Ans: Human pathogens can be sequenced

Disputed parentage can be settled

Suspected culprits can be identified

26. Write down two different methods in gene sequencing for generation of DNA fragments. **(2-times)**

Ans: Gene sequencing can be done by

i. Maxam –Gillbert method and ii. Snager's method

27. Differentiate between Sanger's method and Maxam-Gilbert method of gene sequencing.

Ans:

Sanger's method	Maxam-Gilbert method
In Sanger's method dideoxyribo nucleoside triphosphates are used to terminate DNA synthesis at different sites.	In Maxam Gilbert method DNA threads are chemically cut into pieces of different size.

The Human genome Project

28. Give two goals of human genome project OR What are two goals of human genome project? **(4-times)**

Ans: The two main goals of human genome project are

i. To construct genetic map of human genome.

ii. To construct a base sequence map.

Biotechnology products (Transgenic bacteria)

29. What are bioreactors? **(3-times)**

Ans: Rcombinant DNA technology is used to produce bacteria that reproduce in large vats (tanks) called bioreactors.

30. What is aspartame?

Ans: Aspartame is a dipeptide sweetner better known as nutrasweet.

Transgenic plants

31. What are transgenic plants?

Ans: Plants having foreign DNA are called transgenic plants.

Transgenic animals

32. How transgenic animals are developed? **(2-times)**

Ans: It is possible to micro inject foreign genes into egg by hand, but another method uses vortex mixing. The eggs are placed in an agitator with DNA and silicon-carbide needles, and the needles make tiny holes through which the DNA can enter. When these eggs are fertilized the resulting offspring are transgenic.

Cloning of transgenic Animals

33. Why urine is preferable vehicle for biotechnology product? (2-times)

Ans: Urine is preferable vehicle for biotechnology products because all the animals in the herd urinate-while only female produce milk. Animals start urinate at birth – females do not produce milk until maturity and it is easier to extract protein from urine than milk.

34. **What are cumulus cells?**
Ans: Cumulus cells are those cells which attached or cling to an egg after ovulation.

Gene therapy

35. **Give difference between ex vivo and in vivo gene therapy.** **(8-times)**
Ans:

Ex vivo	In vivo
In ex vivo gene therapy bone marrow stem cells are removed from the body, healthy gene is inserted in them and they again introduced in the body.	In in vivo gene therapy all this process is done in side body without removing stem cells from the body.

36. **What is cystic frbrosis?** **(2-times)**
Ans: In cystic fibrosis patient lack a gene that codes for transmembrane carrier of the chloride ions. Patient often die due to numerous infections of the respiratory tract.

37. **Write down the treatment of cancer through gene therapy.** **(2-times)**
Ans: In cancer gene therapy patient is given genes which make either healthy cell more tolerant to chemotherapy or make tumor more vulnerable to it. Once the bone marrow stem cells were protected it was possible to increase the level of chemotherapy to kill the cancer cells.

38. **How gene therapy has been used for the treatment of coronary artery angioplasty?**
Ans: During coronary artery angioplasty, a balloon catheter is sometimes used to open up closed artery. The balloon catheter is coated with a plasmid that contains a gene for vascular endothelial growth factor. The expression of the gene which promotes the cell division of blood vessels to bypass the blocked area has been observed in at least one patient.

39. **What is gene therapy?** **(3-times)**
Ans: It is a technique in which defective gene is removed from the body and healthy genes are introduced in the bone marrow of the patient.

40. **How cancer patient are being treated by gene therapy?** **(2-times)**
Ans: Gene therapy is also being done to cancer patient, which make them more tolerant of chemotherapy. In clinical trials researchers have given genes to cancer patient that either make healthy cells more tolerant of chemotherapy or make tumors more vulnerable to it. Once the bone marrow stem cells were protected it was possible to increase the level of chemotherapy to kill the cancer cells.

Tissue culture

41. **What is meant by totipotent?** **(2-times)**
Ans: Plant cell is said to be totiopotent because a single cell has full genetic information for the development of a single plant from a single cell.

42. **What do you know about particle gun?** **(2 times 2018)**
Ans: In callus tissue culture gene can be introduced in the cell by particle gun method in which callus is bombarded by DNA coated metal particles gene is inserted in the cell.

43. **What is cell suspension culture?** **(4-times)**
Ans: In cell suspension culture actively growing cultures are cut in to small pieces and shaken in a liquid nutrient medium so that single cell or small group of cells break off and form a suspension. These cell produce the same chemical as entire plant.

Genetic engineering of plants

44. **Name fire fly enzyme and give its role.** **(3-times)**
Ans: Luciferase is the fire fly enzyme it oxidize the luciferin protein and light is produced.

45. **What Gottlieb Haberlandt said that plant cells are totiopotent?**
Ans: He said that plant cells are totiopotent means each plant cell has full genetic potential of the organism- and therefore a single cell could grew a complete plant.

Agriculture plants with improved traits

46. **Name salt tolerant plant.** **(2-times)**
Ans: Rice and sugar cane are salt tolerance crops.

47. What are restriction enzymes? Who first isolated them?

Ans: These are natural enzymes of bacteria which they use for their own protection against viruses. The restriction viruses cut down the viral DNA, but does not harm to the bacterial chromosome. In 1970, Hamilton' O Smith isolated the first restriction enzyme.

48. What are transgenic Bacteria?

Ans: Bateria that have a foreign gene inserted into their bodies are termed as transgenic bacteria.

49. Define Transgenic Plants. Give its two uses.

Ans: Plants having foreign genes incorporated into their cells are known as transgenic plants. Two uses of transgenic plants are:

(i) A weed called mouse – eared cress has been engineered to produce a biodegradable plastic (polyhydroxy – butyrate) in cell grannules.

(ii) Plants are being engineered to produce human hormones, clotting factors and antibodies in their seeds.

50. What is anther culture?

Ans: Anther culture is a technique in which mature anthers are cultured in a medium containing vitamins and growth regulators. Anther culture is a direct way to produce plants that express recessive alleles. If the recessive alleles govern desirable traits, the plants have these traits.

51. What is cloning of a gene?

Ans: Clonning of gene produces many identical copies of a gene. Recombinant DNA technology is used when a very large quantity of gene is required. The use of polymerase chain reaction is a method to create many thousands copies of a particular gene at a time.

52. Define molecular scissors. How were they obtained?

Ans: Restriction enzymes are also called 'molecular scissors' as they cleave DNA at or near specific recognition sequences known as restriction sites. These enzymes make one incision on each of the two strands of DNA are also called restriction endonucleases. Restriction enzymes were obtained from the bacteria by extraction from their bodies.

53. What is gene pharming? (3 times 2018)

Ans: Gene pharming is a technology that scientists use to alter an animal's own DNA, or to splice in new DNA, called a transgene, from another species. In pharming, these genetically modified (transgenic) animals are used mostly to make human proteins that have medicinal value.

54. Name the salt tolerant plants and give its role in future.

Ans: *Arabidopsis* is salt tolerant plant. The cultivation of this plant at saline soil will reclaim the soil conditions. The acrage of the crop in a field will be increased in this way.

55. What are palindromic sequences? Or Define palindromic sequence. (3-times)

Ans: Restriction enzymes cut the DNA at very specific sites characterized by specific sequence of four or six nucleotides arranged symmetrically in the reverse order. Such sequences are known as palindromic sequences.

56. How gene therapy is carried out?

Ans: Gene therapy is the addition of new genes to a patient's cells to replace missing or malfunctioning genes. Researchers typically do this using a virus to carry the genetic cargo into cells, because that's what viruses evolved to do with their own genetic material.

57. Define genomic library.

Ans: A genomic library is a collection of bacterial or bacteriophage clones, each clone containing a particular segment of DNA from the source cell.

58. Write two applications of polymerase chain reactions.

Ans: Two applications of polymerase chain reactions are as follows:

(i) To diagnose viral infections, genetic disorders and cancer.

(ii) In forensic laboratories to identify criminals

59. Define gene therapy. Name two main methods of gene therapy.

Ans: Gene therapy is the insertion of genetic material into human cells for the treatment of a disorder. It includes procedures that give a patient healthy genes to make up for faulty genes and also includes the use of gene to treat various other human illnesses such as cancer and cardiovascular diseases.

There are two main methods used for gene therapy:

Ex-vivo and In-vivo gene therapy.

60. Write down two methods for solving disputed paternity.

Ans: Two methods for solving disputed paternity is as follows:

(i) Polymerase chair reaction (PCR)

(ii) Restriction fragment length polymorphism (RFLP)

2019

61. Give the role of restriction endonucleases.

Ans: These are natural enzymes of bacteria, which they use for their own protection against viruses. The restriction enzymes cuts down the viral DNA, but does not harm to the bacterial chromosome. They are called restriction enzymes because they restrict the growth of viruses. These are also known as restriction endonucleases.

62. Write at least two methods to get a gene of interest.

Ans: Genes can be isolated from the chromosomes by cutting the chromosomes on the flanking sites of the gene using special enzymes known as restriction endonudeases. If however, the genes are small, they can also be synthesized in the laboratory.

63. Describe various steps involved in Ex-vivo gene therapy.

Ans: Steps involved in ex-vivo gene therapy are as follows:

1. Remove stem cells
2. Use retroviruses to infect stem cells with normal gene.
3. Recombinant DNA carries normal gene into genome.
4. Returned genetically engineered cells to patient.

64. Discuss any two benefits of transgenic bacteria to promote health of plants.

Ans: Transgenic bacteria have been produced to promote health of plants for example, bacteria that normally live on plants and encourage the formation of ice crystals have been changed from frost-plus to frost-minus bacteria. Also a bacterium that normally colonizes the roots of corn plants has been endowed with genes (from another bacterium) that code for an insect toxin. The toxin protects the roots from insects.

65. What is plasmid? Give an example.

Ans: Plasmids are natural extra – chromosomal circular DNA molecules which carry genes for antibiotic resistance and fertility etc. For example: PSc 101 has antibiotic resistance gene for tetracycline.

66. Write two practical uses of DNA finger printing technology.

Ans: Two practical uses of DNA fingerprinting are:

(a) To diagnose viral infections.

(b) In forensic laboratories to identify criminals

67. Give two uses of biofilters.

Ans: We use biofilters to help maintain water quality in recirculating or closed loop systems. Biofilters are also used to improve water quality before water is discharged from a facility. There are many different methods of maintaining good water quality and biofiltration is only one component of the total picture.

2021

68. Give three main steps of dideoxy method of gene sequencing.

Ans: The three main steps of dideoxy method of gene sequencing are

I. DNA sequence for chain termination PCR

II. Size separation by gel electrophorasis

III. Gel analysis and determination of DNA sequence

69. What are plasmids? How they were discovered?

Ans: The plasmids are the extra chromosomal parts or the segments present in the bacterial cell. They have gene other than main DNA

Discovery: Plasmids were discovered by the investigators studying the sex life of intestinal bacterium E.coli.

70. What is hypercholesterolemia? How it is treated now a days?

Ans: Hypercholesterolemia is condition which develops when the liver cells lack a receptor for removing cholesterol from the body. The high level of cholesterol makes the patient subject to fatal heart attacks at a young age.

Treatment: In newly developed procedure a small portion of liver is surgically excited and infected with reterovirus containing a normal gene for receptor. Several patients have been experimented a lowering of cholesterol level following this procedure.

71. What is significance of transgenic corn and soybeans?

Ans: Corn and soybean plants have been engineered to be resistant either insect predation or herbicides that are judged to be environmentally safe.

Second both corn and soybean have engineered to improve the quality of food.

72. Write a note on taq polymerase.

Ans: In PCR DNA polymerase used is temperature -insensitive (thermo stable) extracted from the bacterium *Thermus aquaticus*, which lives in hot springs. Commonly this enzyme is also known as Taq polymerase. It can with stand high temperature, which is used to separate double stranded DNA, therefore the replication need not to be interrupted by the need to add more enzyme.

73. What is gene sequencing?

Ans: To determine the order or sequence of nucleotides and genes on the chromosomes is called gene sequence.

74. Compare molecular scissors and vectors.

And:

Vector	Molecular scissor
To make recombinant DNA or to insert desired gene in to the recipient cell vectors are used. Most common vector is a plasmid, obtained from bacterial cell.	Molecular scissors also called restriction enzymes or restriction edndonucleases which cut the DNA from a specific sequence.

75. Define bioreactors. Name any two products of bioreactors.

Ans: **Biorectors:** recombinant DNA technology is used to produce bacteria that reproduce in a large vats (tanks) called bioreactor.

Products of bioreactors are human growth hormone, hepatitis B vaccine.

76. Give two possible ways to get gene of interest.

Ans: Gene of interest can be obtained by means of

i. To synthesize it in the lab by using mRNA and reverse transcriptase.

ii. To isolate it from chromosomes by using restriction enzymes.

77. Differentiate between transgenic plants and transgenic animals.

Ans:

Transgenic plants	Transgenic animals
Plants having foreign DNA are called transgenic plants	Animals having foreign DNA are called transgenic animals.

OBJECTIVE (MCQ'S) OF CHAPTER-24 (EVOLUTION) BOARD PAPERS-2011-21

Concept of evolution Vs Special creation

1. **Carlous Linnaeus believed in:** (3-times)
(a)Natural selection (b) Special creation
(c)Uniformitarinism (d) Inheritance of acquired characters

2. **Which of the following believe in theory of special creation?** (3 times 2018)
(a)Linnaeus (b) Darwin (c) Lyell (d) Lamarck

3. **Which scientist believed in divine creation** (2-times)
(a) Linnaeus (b) Darwin (c)Lyell (d)Cuvier

Evolution from prokaryotes to Eukaryotes

4. **According to endosymbiont hypothesis, the aerobic bacteria developed into:**
(a) Ribosomes (b) Lysosomes (c) Mitochondria (d) Golgi apparatus

5. **Flagella may have arisen through the ingestion of prokaryotes similar to spiral shaped bacteria called:**
(A) *E-coli* (B) *Streptococcus* (C) *Spirochete* (D) *Rhizobium*

6. **Archaeobacteria can tolerate temperature upto** (2-times)
(A) 60°C (B) 90° C (C) 120°C (D) 150°C

7. **Endosymbiont hypothesis was proposed by:**
(A) Cuvier (B) Lyell (C) Lynn Margulis (D) Malthus

Inheritance of Acquired characteristics

8. **Lamark was incharge of invertebrate collection at the natural history museum in:**
(a)Paris (b) London (c) Berlin (d) Bonn

9. **Acquired characteristics of an individual cannot be:**
(a) Inherited (b) Flourished (c) Lost (d) Migrated

Charles Darwin

10. **Who published the essay on the "principle of population"?** (2-times)
(a)Wallace (b) Lamarck (c) Malthus (d) Lyell

11. **Wallace developed theory of natural selection essentially identical to:** (3-times)
(a)Lamarck (b) Linnaeus (c) Darwin (d) Hutton

12. **An essay on the principle of population was published by:** (3-times 2018)
(a)Sutton (b) Lyell (c) Malthus (d) Darwin

13. **Book "The origin of species" was written by:** (3-times 2018)
(a)Linnaean (b) Darwin (c) Lamarck (d) Wallace

14. **Alfred Wallace developed a theory of natural selection essentially identical to:**
(A) Linnaeus's (B) Darwin's (C) Lamark's (D) Mendel's

15. **An example of natural selection in action is evolution of antibiotic resistance in:**
(A) Algae (B) Fungi (C) Bacteria (D) Viruses

Evidences of Evolution

16. The armored mammal that lives only in America is the: (2-times)
(a) Armadillo (b) Pangulin (c) Echidna (d) Porcupine

17. Eustachain tubes connect throat with: (2-times)
(a) Eyes (b) Middle ear (c) Nose (d) Tongue

18. The vermiform appendix is a vestigial organ in: (3-times)
(a) Carnivores (b) Fungivores (c) Herbivores (d) Omnivores

19. In terrestrial vertebrates, the gill pouches develop into:
(a) Gills (b) Lungs (c) Nose (d) Eustachian tube

20. Which of the following is vestigial organ of whale?
(A) Pelvis (B) Leg bones (C) Lungs (D) Pelvis and leg bones

21. Most fossils are found in:
(A) Ice (B) Stony rock (C) Mud (D) Sedimentary rock

Neo-Darwinism

22. Who published papers on inheritance?
(A) Malthus (B) Cuvier (C) Lyell (D) Mendel

Population, Gene pool, Allele and genotype frequency

23. The total aggregate of genes in a poputation at any one time is called (2-times)
(a)Genome (b) Succession (c) Gene pool (d) Gene flow

24. A group of interbreeding individuals belonging into a particular species and sharing a common geography area is called: (4-times)
(a) Community (b) Population (c) Ecosystem (d) Biosphere

25. A localized group of individuals belonging to the same species is called as:
(A) Community (B) Population (C) Ecosystem (D) Biosphere

Factors Affecting Gene frequency

26. The change in frequency of alleles at a locus that occurs by chance is called (2-times)
(a)Gene pool (b) Genetic (c) Genetic drift (d) Mutation

27. Emigration and immigration of members of population causes disturbance in the: (2-times)
(a) Genetic Drift (b) Genotype (c)Gene pool (d) Gene frequency

28. The ultimate source of all evolutionary changes, which affect gene frequency is:
(a) Selection (b) Migration (c) Mutation (d) Genetic drift

Endangered Species

29. A species which is in imminent danger of extinction throughout its range is called: (2-times)
(a)Scarce Species (b) Threatened Species
(c)Rare Species (d) Endangered Species

30. Endangered species of plants have been recorded to more than (2-times)
(A) 300 (B) 400 (C) 500 (D) 600

31. In Pakistan among the animals declared extinct is:
(A) White headed duck (B) Marbled teal
(C) Crocodile (D) Houbara bustard

32. **Zoos and botanical gardens are to save species whose extinction is:**
(A) Permanent (B) Dominant (C) Imminent (D) Prominent

2018

33. **The first photosynthetic organisms probably used Hydrogen Suphide as a source of Hydrogen for reducing CO_2 to:**
(a) Sugars (b) H_2CO_3 (c) RUBP (d) Malate

34. **Darwin "Origin of species" was published in:**
(a) 1840 (b) 1859 (c) 1865 (d) 1890

35. **A respiratory protein found in all aerobic species is the:**
(a) Cytochrome-a (b) Cytochorme-b (c) Cytochrome-c (d) Cytochrome-d

36. **How many types of finches did Darwin collect on Galapagos Island:**
(a) 13 types (b) 20 types (c) 25 types (d) 30 types

37. **Which respiratory protein is found in all aerobic species?**
(a) glial cell line (b) cytochrome (c) serine (d) cysteine

38. **Biogeography, is the geographical distribution of:**
(A) Phylum (B) Class (C) Species (D) Genus

39. **The floral parts of a flowering plant are:**
(A) Homologous (B) Analogous (C) Similar (D) Different

40. **Who published the essay on the "Principles of Population".**
(A) Darwin (B) Wallace (C) Malthus (D) Lyell

41. **Which one is not a vestigial organ of human being?**
(A) appendix (B) coccyx (C) nictitating membrane (D) eye lid

2021

42- **The prokaryotes may have arisen more than billion years ago.**
(A) 3.5 (B) 4.5 (C) 5.5 (D) 6.5

43- **According to Endosymbiont Hypothesis, ingestion of Prokaryotes similar to Cyanobacteria could have developed into:**
(A) Mitochondria (B) Chloroplasts (C) Nucleus (D) Dictyosomes

44- **A group of bacteria that tolerate temperature up to 120°C are called:**
(A) Cyanobacteria (B) Eubacteria (C) Archaebacteria (D) Mycoplasma

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14
B	A	A	C	C	C	C	A	A	C	C	C	B	B
15	16	17	18	19	20	21	22	23	24	25	26	27	28
C	A	B	A	D	D	D	D	C	B	B	C	D	C
29	30	31	32	33	34	35	36	37	38	39	40	41	42
D	C	C	C	A	A	C	A	B	C	A	C	D	A
43	44												
B	C												

SHORT QUESTIONS AND ANSWERS OF CHAPTER-24 (EVOLUTION) BOARD PAPERS-2011-21

Concept of evolution Vs Special creation (4 times)

1. Define theory of special creation.

Ans: According to this theory all living things came into existence in their present form especially and specifically created by nature.

2. Define evolution.

Ans: Evolution refers to the processes that have transformed life on earth from its earliest forms to the vast diversity that we observe today.

3. Give two contribution of Cuvier.

Ans: He much contributed to the field of paleobotnay and explained earth's history by catastrophism.

Evolution from prokaryotes to eukaryotes (2-times)

4. What are hydrodermal vents?

Ans: Origin of life may begin deep in the oceans; in under water hot springs called hydrodermal vents. These vents could have supplied the energy & raw materials for the origin & survival of early life forms.

5. What is endosymbiont hypothesis? (4-times 2018)

Ans: Hypothesis which explains the origin of organelles by symbiotic association is called endosymbiont hypothesis.

Charles Darwin

6. Define Lamarkism and theory of special creation.

Ans: Lamark gave two important points of his theory of evolution

1. Use and disuse of organs 2. Inheritance of acquired characters

According to this theory all living things came into existence in their present form especially and specifically created by nature.

7. Define theory of natural selection.

Ans: Natural selection occurs through an interaction between the environment and the variability inherent in any population.

Evidences of evolution

8. What are vestigial organs? Give one example. (7-times)

Ans: Organs which are rudimentary or non functional in present organisms but were full developed in the ancient organisms are called vestigial organs.

For example: Appendix in man, ear muscles in man.

9. Differentiate between homologous and analogous organs. (6-times)

OR Define analogous organs.

Ans:

Organs which have similar anatomical structure but perform different functions are called homologous organs. For example: Arm of man, front leg of horse, wing of bat and bird are homologous organs.	Organs which have different structures but perform same functions are called analogous organs. For example: wings of bat, birds & insects.

10. Differentiate between convergent and divergent evolution (2-time)

Ans: Evolutionary processes that leads to the formation of homologous structures is called convergent evolution.

Evolutionary processes which leads to the formation of analogous structures in organisms is called divergent evolution.

11. What is role of geographical barriers in evolution? (2-times)

Ans: Due to geographical barrier the members of a population cannot meet with each other nor they can reproduce with each other. After a long time they show morphological as well as genetic differences due to living in different habitats and

this leads to evolution of a new species. For example: Wings of bird and wings of an insect.

12. Explain the term homology with a suitable example. (2-times)

Ans: Similarity in structure due to common ancestral origin is called homology. Homologous organs are best example of homology like flipper of whale, front leg of horse, arm of man, wing of bird.

Natural selection and artificial selection

13. Define hybridization.

Ans: It is a process in which two organisms having different genotypes are crossed togehter to produce a new organism which show the characters of both the parents.

14. How artificial selection is different from natural selection? (2-times)

Ans:

Natural selection	Artificial selection
Natural selection occurs through an interaction between the environment and the variability inherent in any population.	It occurs by breeding of domesticated plants and animals. Humans have modified other species over many generations selecting individuals with the desirable traits as breeding stock.

Neo-Darwinism

15. What is Neo-Darwinism? (2-times)

Or Define the term neo-Darwinism.

Ans: Darwin's theory has been modified from ideas of many different fields including palentology, taxonomy, biogeography and population genetics is called Neo-Darwinism.

Population, Gene pool, Allele and genotype frequency

16. Define gene pool. (2-times)

Ans: The total aggregate of genes present in a population is called gene pool or whole genetic information present in a population is called gene pool.

17. Define species. (3-times)

Ans: Group of organisms which have same morphological characters and can reproduce with each other and can produce fertile offspring similar to the themselves is called species.

18. Give the concept of fixed alleles.

Ans: If the members of a population are homozygous for the same allele, that allele is said to be fixed in the gene pool.

19. Differentiate between population and gene pool.

Ans:

Population	Gene pool
Member of same species living in an area at the same time at same place is called population.	Total aggregate of genes present in a population at any one time is called gene pool.

Hardy Weinberg Theorem

20. Define Hardy Weinberg's theorem and give its formula. (3 times)

OR What is Hardy – Weinberg theorem. Give its equation.

OR State Hardy – Weinberg theorem. (2 times)

Ans: It states that the frequencies of alleles and genotypes in a population remain constant over the generations unless acted upon by agents other than sexual recombination.

$$(P+q)^2 = P^2 + q^2 + 2pq$$

Factors affecting gene frequency

21. Name any four factors affecting gene frequency.

Ans Following are the factors which cause change in gene frequency

i. Genetic drift. ii. Migration
iii. Selection iv. Random mating

22. Explain genetic drift as factors effecting gene frequency. (6-times)

OR How does genetic drift affect the gene frequency. (2 trimes)

Ans: It is a change in frequency of alleles at a locus that occurs by chance. In small populations, such as fluctuations may lead to loss of particular alleles. This may occur in a small population when a few individual fail to reproduce and then genes are lost from population.

Endangered Species

23. Differentiate between endangered and threatened species. (5-times)

Ans:

Endangered Species	Threatened Species
Species which are near to extinct are called endangered species	The species which become endangered in near future are called **threatened species.**

24. Name any four species declared extinct in Pakistan. (3-times)

Ans: Cheetha, Crocodile, Tiger and Asian lion.

25. Define Biodiversity. (3-times)

Ans: The variety of organisms present in an area is called biodiversity.

26. Differentiate between endangered and extinct species. (2-times)

Ans:

Endangered Species	Extinct Species
Endangered species are those which are near to extinct.	Extinct species are those which have been vanished from biosphere and even a single member is not present on the earth anywhere.

27. What are endangered species? Give one component of their conservation plan.

Ans: The species which are near to extinct in near future are called endangered species. They can be conserved or protecting in botanical gardens, zoos, and making strict laws, preventing their hunting or cutting of trees.

28. Name any four species declared extinct in Pakistan

Ans: Cheetah, gavial, tiger and crocodile have declared extinct in Pakistan.

29. **Differentiate natural and artificial selection.**

Ans:

Natural selection	Artificial selection
➢ In natural selection, nature selects the individuals with favourable variations for better survival in an environment. ➢ Selection pressure is exerted by environmental factors.	➢ It is the selective breeding of domesticated plants and animals to produce off spring's with characters desirable to humans. ➢ Selection pressure is exerted by humans.

30. **What is endosymbiont hypothesis? Give example.** **(2-times)**

Ans: The enkaryotic cell might have evolved when a large anaerobic amoeboid prokaryote ingested small aerobic bacteria and stabilized them instead of digesting them. This idea is known as the endosymbiont hypothesis. According to this hypothesis aerobic bacteria developed into mitochondria, which are the sites of aerobic respiration & most energy conversion in eukaryotic cells.

31. **What are endangered species? Give example.** **(3-times)**

Ans: An endangered species is in imminent danger of extinction throughout its range (where it lives).

Example: Cheetah, Tiger, Asian lion, Indian rhino, cheer pheasant, crocodile and Gavial.

32. **Describe briefly, how molecular biology supports evolution.**

Ans: Evolutionary relationships among species are reflected in their DNA and proteins in their genes and gene products.

If two species have genes and proteins with sequences of monomers that match closely, the sequences must have been copied from a common ancestor. For example, a common genetic code brings evidence that all life is related. Molecular biology has thus provided strong evidence in support of evolution as the basis for unity and diversity of life.

33. Define homologous organs, give one example.

Ans: Homologous organs are functionally different but structurally alike e.g forelimbs of man, bat, horse, whale etc are example of divergent evolution. Analogous organs are functionally alikes but structurally different e.g wings of bat, birds and insects etc. are examples of convergent evolution.

34. Briefly describe, how biogeography provides an evidence for evolution?

Ans: It was the geographical distribution of species.....biogeography......that first suggested the idea of evolution to Darwin. Islands have many species of plants and animals that are endemic but closely related to species of the nearest mainland or neighboring island.

35. Write down the measures for the preservation of endangered species.

Ans: Preservation of endangered species depends on the following components:

1. Protected landscapes and multiple use areas that allow controlled private activity but also retain value as a wild life habitat.
2. Zoos and botanical gardens to save species whose extinction is imminent.

36. How molecular biology provides an evidence for evolution?

Ans: Evolutionary relationships among species are reflected in their DNA and proteins --- in their genes and gene products. If two species have genes and proteins with sequences of monomers that match closely, the sequences must have been copied from a common ancestor.

For example: a common genetic code brings evidence that all life is related. Molecular biology has thus provides strong evidence in support of evolution as the basis for the unity and diversity of life.

37. Differentiate Natural Selection from Special Creation.

Ans:

Natural Selection	Special creation
Drawin suggested that populations of individual species became better adapted to their local environments through natural selection. Drawin's theory of natural selection was based on the following observations. (a) Struggle for existence. (b) Survival of the fittest elimination of the weakest. (c) Evolution of new species.	According to the theory of special creation all living things came into existence in their present forms especially and specifically created by nature. Among the scientists who believed in divine creation was carolus Linnaeus (1707-1778)

38. What is membrane invagination hypothesis?

Ans: Another hypothesis for the evolution of eukaryotic cells proposes that prokaryotic cell membrane invginated (folded inverd) to enclose copies of its genetic material. This invagination resulted in the formation of several double membrane bound entities (organelles) in a single cell. These entities could then have evolved into the eukaryotic mitochondrion, nucleus, chloroplast etc.

39. What is the concept of inheritance of acquired characteristics?

Ans: In this concept, of heredity, the modifications an organism acquires during its lifetime can be passed along to its offspring e.g the long neck of the giraffe, Lamarck reasoned, evolved gradually as the cumulative product of a great many generations of ancestors stretching higher and higher. However, now we know that acquired characters can not be inherited.

40. What is Biogeography?

Ans: The study of distribution of species in different geographical regions of the earth is called biogeography.

41. What is role of migration in affecting gene frequency?

Ans: **Migration:** A very potent agent of change, migration locally acts to prevent evolutionary changes by preventing populations that can exchange members from

diverting from one another. Emigration and immigration of members of a population cause disturbance in gene pool.

42. Define genetic drift and hydrodermal vents.

Ans: One of the speculations trying to explain origin of life is that it may have begun deep in the oceans, in under water hot springs called hydrodermal vents. These vents could have supplied the energy and raw material for origin and survival of early life.

43. What do you mean by descent with modification?

Ans: **Descent with modification:** According to this view new generation is born with changes of new characters as compared to their parents is called descent with modification.

Darwin believed in perceived unity in life, with all organisms related through descent from some common ancestors that lived in remote past. In the Darwinian view, the history of life is like a tree, with multiple branching and rebranching from a common trunk all the way to the tips of the living twigs, symbolic of the current diversity of organisms. At each fork of the evolutionary tree is an ancestor common to all lines of evolutionary branching from that fork.

44. Define gene frequency.

Ans: **Gene frequency or Allele frequency** is the relative frequency of an allele at a particular locus in a population expressed as a fraction or percentage.

45. What are fossils? Where they are found?

Ans: Fossils are either the actual remains or traces of organisms that lived in ancient times. The organism may be embedded in sand, resins or ice, or an impression or cast is made of the body parts. The tissue being replaced or petrified by silica or calcium carbonate minerals.

Most fossils are found in sedimentary rocks.

46. Define genetic drift.

Ans: It is the change in the frequency of alleles at a locus that occurs by chance.

47. Write any four factors affecting gene frequency of a population.

Ans: Factors affecting gene frequency of a population are genetic drift, migration, mutation, selection, non random mating.

LONG QUESTIONS OF CHAPTER-24 (EVOLUTION) BOARD PAPERS-2011-21

1. What are the endangered species? What measures could be adopted for their preservation?
2. How fossil record provides evidence in favour of evolution? (2-times)
3. How are prokaryotes evolved into eukaryotes? (3-times)
4. Write about any two evidence in favour of evolution.
5. Explain Darwin's theory of natural selection. (3-times)
6. Describe the Hardy Weinberg theorem.
7. Describe the various factors affecting gene frequency. (2-times)
8. Write note on Wildlife.
9. Explain Lamarck's theory of Evolution.
9. How does comparative anatomy provide evidence of evolution?
10. Explain Darwin theory of natural selection. (4-times)
11. Write a short note on Neo-Darwanism. (2-times)
12. Describe comparative embryology and molecular biology as an evidence of evolution. (2-times)

2016

13. Write a note on endangered species with their methods of conservation (2-times)
14. Write down the main points of theory of natural selection.
15. Explain factors affecting gene frequency.
16. Explain endosymbiont hypothesis for origin of eukaryotic Cells.
17. Describe the inheritance of acquired characteristics. (2-times)

OBJECTIVE (MCQ'S) OF CHAPTER-25 (ECOSYSTEM) BOARD PAPERS-2011-21

Ecosystem

1. **Who defined the niche as the species occupation?**
(a) Charles Eton (b) Charles Layll (c) Cuvier (d) Sutton

2. **A group of inter-breeding individuals, belonging to same species and sharing a common geographic area, is called**
(a) Community (b) Biome (c) Population (d) Ecosystem

3 **Who proposed the term niche in ecology?**
(A) Haeckel (B) Darwin (C) Charles Eton (D) Joseph Grinnel

Biosphere

4. **All living organisms of the planet earth are collectively called: (2-times)**
(a) Biosphere (b) Lithosphere (c) Hydrosphere (d) Atmosphere

5. **The actual location of place where an organism lives is called (4-times)**
(a)Niche (b) Environment (c) Habitat (d)Ecosystem

6. **Biosphere is spread out over the surface of planet earth extending about:**
(A) 3-6 kilometers (B) 4-8 kilometers (C) 8-10 kilometers (D) 8-12 Kilometers

Autecology & Synecology

7. **Study of different communities with relation of environment. (2 times 2018)**
OR **Study of relationship of different communities to environment is called:**
(A) Synecology (B) Autecology (C) Embryology (D) Zoology

8. **Major regional ecological community of plants and animals form.**
(a)Triomes (b) Biosphere (c) Biomes (d) Biogeography

9. **All populations within an ecosystem are known as: (3-times)**
(a) Biosphere (b) Biome (c) Succession (d) Community

10. **The whole of the world's land is called: (3-times)**
(a) Ecosphere (b) Lithosphere (c) Biosphere (d) Hydrosphere

Food chain and food web

11. **All the food chains and food webs begin with (3-times)**
(a) Primary consumer (b) Secondary consumer (c) Decomposers (d) producers

12. **In nature, balance of ecosystem is kept by:**
(A) Food chain (B) Food web (C) Succession (D) Trophic level

Succession

13. **Which one of the following is foliage lichen?**
(a) *Tortula* (b) *Dermatocarpon* (c) *Polytrichum* (d) *Rhizocarpon*

14. **In Xerosere succession, *Polytrichum*, *Tortula* etc. appear during:**
(a) Moss stage (b) Foliage lichen stage
(c) Crustose Lichen stage (d) Herbaceous stage

15. **A change in the community structure of an ecosystem over a period of time is:**
(a) Niche (b) Unstable ecosystem (c) Succession (d) Pioneer

16. **Succulent plants have water stored in tissue: (3-times)**
(a) Cacti (b) Moss (c) Rose (d) Spruce

17. **Primary succession, which starts in a pond ecosystem, is termed as:**
(a) Ecosphere (b) Derosere (c) Hydrosere (d) Xerosere

18. The stage in which the lichens are just like crumpled leaves attached at one point: (3-times)
(a)Moss stage (b) Crustose lichen stage (c) Foliage lichen stage (d) Shrub stage

19. In each case succession is initiated by a few hardy invaders called:
(A) Starters (B) Pioneers (C) Climax community (D) Decomposers

20. Herbaceous stage in xerosere is the:-
(a) First stage (b) Third stage (c) Fourth stage (d) Last stage

21. The animal that is caught and eaten is called:
(A) Predator (B) Prey (C) Host (D) Parasite

22. If population of predator increases then population of prey:
(A) Increases (B) Decreases (C) May increase or decrease (D) Has no effect

23. A predator is a:
(A) Producer (B) Consumer (C) Decomposer (D) Reducer

24. One of the following is an example of predator prey relationship:
(A) Fungus and alga (B) Flower and insect (C) Fox and rabbit (D) Root nodule bacteria

Parasitism and its significance

25. Disease in living organism caused by parasites are called (3-times)
(a) Infestation (b) Endoparasites (c) Disinfestation (d) Ectoparasites

Symbiosis

26. Lichen is symbiotic association between a fungus and (2-times)
(a) Diatom (b) An Alga (c) Angiosperms (d) Gymnosperms

27. The symbiotic relationship between insect and flowering plants is the example of: (2 times)
(a) Parasitism (b) Predation (c) Mutualism (d) Commensalism

28. Lichens are an example of
(a) Parasitism (b) Mutualism (c) Predation (d) Commensalism

Grazing

29. Over grazing may lead to:
(a) Tundra (b) Grass land (c) Taiga (d) Desert

30. Moderate grazing is very helpful to maintain ecosystem: (2-times)
(a) Tundra (b) Grassland (c) Pond (d) Desert

Biogeochemical cycle and nitrogen cycle

31. They release chemical elements as ions:
(a) Producer (b) Consumer (c) Decomposers (d) Carnivores

32. The macronutrient, in biogeochemical cycle is: (2-times)
(a) Iron (b) Calcium (c) Zinc (d) Iodine

33. Soil erosion, fire and water percolation down through the soil cause loss of:
(a) Sulphates (b) Carbonates (c) Nitrates (d) Biosphere

34. When bacteria in soil oxidize ammonia or ammonium ions, this is called: (2-times)
(A) Oxidation (B) Denitrification (C) Ammonification (D) Nitrification

Flow of energy in food chain of ecosystem

35. The total energy from the sun is trapped by the producer in an ecosystem: (2-times)
(a)1% (b)1.5% (c)2% (d)2.5%

36. The green photosynthetic plants which capture and bring light energy into ecosystem are (2-times)
(a) Scavengers (b) Decomposers (c) Consumers (d) Producers

37. **The productivity can be indicated by:**
(A) Consumption of CO_2 (B) Evolution of CO_2 (C) Consumption of O_2 (D) Evolution of N_2

2018

38. **Primary succession may start in a dry soil or rock is called:**
(a) Hydrosere (b) Xerosere (c) Desert (d) Derosere
39. **An association between organisms of different species in which one partner gets benefit and other is harmed:**
(a) Mutualism (b) Symbiosis (c) Parasitism (d) Commensalism
40. **Biome is a large:**
(a) Simple community (b) Complex community (c) Regional community (d) Climax community
41. **Energy from sun flows through an ecosystem in the form of :**
(a) light (b) radiant heat (c) temperature (d) evaporation

2019

42. **Bacteria in the root nodules fix nitrogen and convert it into:**
(A) Nitrate (B) Nitrite (C) Amino acids (D) Ammonia
43. **Once nitrate enters the plant cell it is reduced to:**
(A) Nitrite (B) Ammonia (C) Proteins (D) Carbohydrate
44. **Mutualism is a type of:**
(A) Symbiosis (B) Commensalism (C) Parasitism (D) Predation
45. **Which of the following is macronutrient?**
(A) Zinc (B) Iron (C) Sulphur (D) Iodine
46. **The bacteria in the root nodules fix nitrogen in soil from air, converting it into ________:**
(A) Nitrate (B) Nitrite (C) Ammonia (D) Amino Acid

2021

47- **The role a species plays in a community including behavior and influence is:**
(A) Habitat (B) Biome (C) Niche (D) Population
48- **Relationship between Shark and Remora attached to it is an example of**
(A) Symbiosis (B) Mutualism (C) Parasitism (D) Commensalism
49- **The organism, which inhibit the root nodules of legume plants are:**
(A) Fungi (B) Algae (C) Bacteria (D) Cynobacteria
50- **The basic functional unit of ecology is**
(A) Ecosystem (B) population (C) niche (D) community
51- **The food relationship predator-prey creates a**
(A) Chain (B) Cycle (C) Stage (D) Circle
52- **Lithosphere includes:**
(A) Air (B) Water (C) Gases (D) Earth, soil
53- **The process in which micro-organism use proteins and release ammonia or ammonium ions is called:**
(A) Nitrification (B) Denitrification (C) Ammonification (D) Assimilation
54. **Succession ends with a diver and relatively stable:** **(2-times)**
(a) Xerosere (b) Climax community (c) Derosere (d) Hydrosere

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	C	D	A	C	C	A	C	D	B	D	B	B	A
15	16	17	18	19	20	21	22	23	24	25	26	27	28
C	A	C	C	B	C	B	B	B	C	A	B	C	B
29	30	31	32	33	34	35	36	37	38	39	40	41	42
D	B	C	B	C	D	A	D	A	B	C	C	B	C
43	44	45	46	47	48	49	50	51	52	53	54		
B	A	C	D	C	D	C	A	B	D	C	B		

SHORT QUESTIONS AND ANSWERS OF CHAPTER-25 (ECOSYSTEM) BOARD PAPERS-2011-21

Ecosystem

1. How community is different from population. **(4-times)**

Ans:

When different populations living together in an area is called community.	When members of same species live together at same place at same time is called **population.**

2. Differentiate between habitat and niche. **(2-times)**

Ans:

Habitat is the place where an organism lives or home of the species is called **habitat.**	**Niche:** The role or profession of the species is called **niche.**

3. Compare population and community and give their example **(3-times)**

Ans:

Members of the same species living in same area at same time is called **population** Examples: No. of rats in a rice field. No. of students in bio class.	Different populations living in same area are called **community.** Examples: Forest community, pond community.

4. Give the role of decomposers in an ecosystem. **(2-times)**

Ans: Decomposers are the organisms which decompose the dead bodies are called decomposers; they recycle the nutrients and make them available for plant growth.

5. Name three levels of integration in community.

Ans: Three levels of community integeration are

i. individual level
ii. population level
iii. community level

6. What do you know about the term Ecosystem? **(2-times)**

Ans: The eco part of the word is related to environment and system mean collection of related parts, which function as a unit.

It is a complex system in which living things (biotic components) interact with their environment (abiotic compnents).

Biosphere

7. What is biosphere?

Ans: The living part of the earth is called biosphere. Or it is a thin layer of earth in which all living organisms live.

Autecology & Synecology

8. Compare autoecology with synecology. (2-times)

OR Differentiate between autecology and synecology. (6-times)

Ans:

Autecology	Synecology
Study of single population in relation to environment is called autecology.	The study of different communities in relation to environment is called synecology or community ecology.

Components of ecosystem

9. Define humus. (4-times)

Ans: Humus is the decomposed organic matter formed by decomposers after the decomposition of dead bodies.

10. What are biotic components of an ecosystem?

Ans: Living components of ecosystem are called biotic components, this include producers, consumers and decomposers.

Food chain and food web

11. Define food chain and food web only. (5-times)

Ans: Process of eating and being eaten is called food chain.

Food web is combination of many food chains.

For example: Grass → Cow → Man

12. Sketch food chain to show various trophic levels.

Ans: Grass ⟶ deer ⟶ lion ⟶ vulture ⟶ decomposer

Grass 1st trophic level

Deer 2nd tropic level

Lion 3rd trophic level

Vulture 4th trophic level

Decomposer 5th trophic level

13. Differentiate between food chain and food web. (3-times)

Ans:

Food chain	Food web
Process of eating and being eaten is called food chain.	Combination of different food chains is called food web.

14. Define food web, give its significance.

Ans: **Food web:** All the food chains interconnected or linked together to from food web.

Significance: The variety of pathways helps to maintain the stability of the ecosystem.Many alternate source of food are available to an organism, if one is not available the other can be used as food source.

15. What do you understand by the term "trophic level?"

Ans: The level in food chain at which organism feed is called trophic level. There are various trophic levels in the ecosystem e.g., producers make first trophic level; herbivores occupy second trophic level and so on.

Succession

16. Differentiate between pioneer and climax community.

Ans:

The first plant which colonizes on a bare land that starts the process of succession are called pioneers	The stable complex community which is formed as a result of succession is called climax community.

17. Define xerosere. Give flow chart of its stages.

Ans: Process of succession on bare rock is called xerosere.
Crustose lichens → foliose lichens → moss stage → herbaceous stage → shrub stage → tree climax community

18. Define foliose lichens with one example. **(2 times)**

OR What is foliose lichen stage? Give an example.

Ans: In this stage the lichens are just crumpled leaves attached at one point. It produces shade to the crustose lichens as a result of which their growth is reduced. Examples are *Dermatocarpon, Permellia*. **(6 times)**

19. Differentiate between secondary and primary succession.

Ans:

Primary succession is the process of succession which starts on a bare rock or dry place where no life exists earlier is called primary succession.	Secondary succession is the process which starts on a place where life exists but due to some reasons it is destroyed is called secondary succession. During secondary succession a new ecosystem develops after an existing ecosystem is disturbed as in case of forced fire or an abandoned farm field.

(6-times)

20. Differentiate between Hydrosere and Xerosere.

Ans:

When process of succession occurs on aquatic place (pond or lake) it is called hydrosere	Succession occur in dry place (Rock)it is called xerosere.

(3-times)

21. Define succession. Name its types.

Ans: Succession is a sequence of changes in the community structure of an ecosystem over a period of time. In each case succession is initiated by a few hardy invaders called pioneers and it ends with a diverse and relatively stable climax community. e.g succession start on a bare rock is known as xerosere.

i. Primary succession ii. Secondary succession

22. What is climax forest?

Ans: It is the last stage of the xerosere succession. At this stage woody plants dominate and this stage in succession remains essentially the same if nothing changes in the environment to upset the balance.

23. Define pioneers and climax community.

Ans: **Pioneers:** The plants which first of all colonize on a bare land and start the process of succession are called pioneers. They are hardly invaders.

Climax community: It is the last stage which is most stable and remains essentially same if nothing changes in the environment to upset the balance.

24. Differentiate between hydrosere and xerosere. **(2 times)**

Ans:

Hydrosere	Xerosere
The process of succession started on wetland or a pond is called hydrosere.	The process of succession started on dry land is called xerosere.

25. Define secondary succession.

Ans: Secondary succession is the process which starts on a place where life exists but due to some reasons it is destroyed is called secondary succession.
During secondary succession a new ecosystem develops after an existing ecosystem is disturbed as in case of forced fire or an abandoned farm field.

26. Write few lines on crustose lichens.

Ans: Crustose refers to land lifeless structure, any external protective layer surface on the rock, special types of lichens get impregnated in the form of crust. They live in extreme conditions, sometimes their surface is wet due to rain and dew drops. They absorb water during the dry season. They are quiescent or dormant. Normally desiccated during dry season.

10 **Predation and its significance**

27. Give significance of predation. **(6-times)**

Ans: The size of predator and prey population is related to each other. The size of each population is determined by the other. If the number of preys are large this leads to an increase in the number of predators, as predators feeds upon the prey, the number of prey begins to fall. The number of predators also decreases since they have smaller food supply.

28. Differentiate between predator and prey. **(4-times)**

Ans:

predator	prey
Predator which catches and kills; the other organism and use it as food is called predator. It is usually a hunter and carnivore like lion, cat dog etc.	Prey is the organism which is caught by the predator and eaten is called prey like rabbit, deer etc.

29. Differentiate between predation and parasitism. **(2-times)**

Ans:

Predation	Parasitism
Relation between prey and predator is called predation. Prey is captured, killed and eaten by the predator.	The relation between parasite and host is called is parasitism. In parasitism the parasite is totally dependent on host, parasite get food, protection from the host and also harm its host.

Parasitism and its significance

30. What is infestation?

Ans: Infection caused by the parasites is called infestation or mode of transmission of parasite into host is called infestation.

31. What is parasitism? **(3-times)**

Ans: Process in which a parasite lives in living organisms and cause some harm to its host is called parasitism or relationship between host and parasite is called parasitism.

32. Differentiate between ectoparasites and endoparasites. **(4-times)**

Ans:

Ectoparasite: Parasite which lives on outer surface of the body is called ectoparasite like lice, ticks and mites.	**Endoparassites:** Parasites which live inside the body of its host is called endoparasite like liver fluke.

33. What is parasitism? Give its kind.

Ans: Process in which a parasite lives in living organisms and cause some harm to its host is called parasitism or relationship between host and parasite is called parasitism.

Kinds of parasites: **Ectoparasite:** Parasite which lives on outer surface of the body is called ectoparasite like lice, ticks and mites.

Endoparassites: Parasites which live inside the body of its host is called endoparasite like liver fluke.

34. Differentiate between parasite and parasitism.

Ans:

Parasite	Parasitism
An organism which lives in or on the body of its host and get food, shelter from its host and also cause harm to its host is called parasite.	Process in which a parasite lives in living organisms and cause some harm to its host is called parasitism or relationship between host and parasite is called parasitism.

Symbiosis

35. What are root nodules? Give their importance. **(6-times)**

Ans: Root nodules are present in leguminous plants which contains bacteria.

Importance is that these nodules contain nitrogen fixing bacteria which fix the nitrogen and supply it to the plant and play an important role in plant growth. (5-times)

36. What is mycorrhiza?

Ans: It is a symbiotic association between the roots of higher plants and hyphae of the fungi is called mycorrhiza. Fungus provides nutrient to the plant and in turn itself get carbohydrates from the plant. (5-times)

37. Define mutualism. Give examples.

OR Define mutualism. Give one example.

Ans: It is an association in which both members and partners get benefit from each other is called mutualism. For example: Mycorrhiza. It is an symbiotic association between the roots of higher plants and hyphae of the fungi is called mycorrhiza. Fungus provides nutrient to the plant and in turn itself get carbohydrates from the plant.

38. What are lichens and mycorrhiza?(4-times)

Ans: **Mycorrhiza.** It is a symbiotic association between the roots of higher plants and hyphae of the fungi is called mycorrhiza. Fungus provides nutrient to the plant and in turn itself get carbohydrates from the plant.

Lichens: It is the association between algae and fungi. Fungi give protection to algae from desiccation while algae perform photosynthesis and provide nutrition to algae. (4-times)

39. Differentiate between mutualism and commensalism.

Ans:

Mutualism is the symbiotic relationship in which both the partners get benefit from each other is called **mutualism** For example mycorrhiza and lichens.	**Commensalism** is the symbiotic relationship in which only one of the partner get benefit while other neither get benefit nor harmed is called mutualism for example epiphytes.

(2-times)

40. What is symbiosis? Give one example.

Ans: This is a beneficial association between two organisms, which brings benefit to both the organisms. For example relation between algae and fungi to form lichens. Algae make food and also give it to fungi while fungi give protection to algae in return.

41. What is commensalism? Give an example. OR Define commensalism. (4 times)

Ans: In this type of relationship only one organism get benefit from the relationship. The other is not affected at all. For example, Sharks may have small fish called remoras attach to them. As the shark feed the remoras pick the scraps. The remoras get benefit from this relationship the shark is not affected at all.

42. Define lichens. OR What are lichens? Write its significance. (2 times)

Ans: **Lichens:** It is the association between algae and fungi. Fungi give protection to algae from dessication while algae perform photosynthesis and provide nutrition to algae.

Grazing

43. Define grazing.

Ans: Many animals like rabbits, goats, sheeps, cows, buffaloes and horses feed on grasses. This mode of feeding is called grazing and these animals are called grazers.

44. What is the effect of moderate grazing on grassland? OR How moderate grazing is helpful for ecosystem.

Ans: Moderate grazing is very helpful in maintain the grass land ecosystem. It destroy the competitors and help the grass to grow well.

45. How does over grazing affect a grass land ecosystem?

Ans: Due to over grazing the productivity of the grass land is affected. If too much animals graze then grass will hardly regrow. Secondly the hooves of the grazing animals will trample the soil in to hard layer as a result of which rain water will not penetrate this soil. The final result of over grazing is barren land.

Biogeochemical cycle and nitrogen cycle

46. What are biogeochemical cycles? Give an example. (2-times)

Ans: Circular movement or recycling of the elements between the organisms and the environment is called biogeochemical cycle.

47. Define ammonification and assimilation (3-times)

Ans: **Ammonification:** The formation of ammonia by ammonifying bacteria during nitrogen cycle is called ammonification.

Assimilation: Synthesis of nitrogen containing compounds from the nitrates during the nitrogen cycle is called assimilation.

48. Differentiate between macronutrients and micronutrients. (3-times)

Ans:

macronutrients	micronutrients
Macronutirents are those which required by the organisms in large amount are called macronutrients like water, carbon, hydrogen, oxygen.	Micronutrients are those which required by the organisms in less quantity or in trace amount like sulphure, phosphorous, magnesium etc.

49. Differentiate between nitrification and denitrification. (2 times)

Ans:

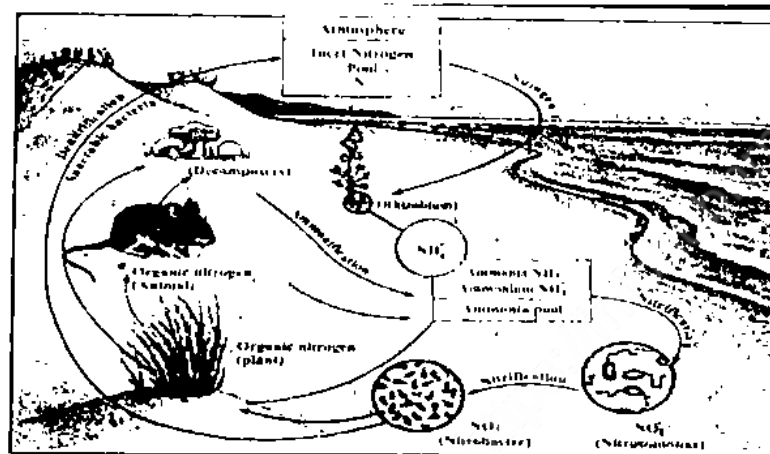
Conversion of ammonia and ammonium ions by oxidation process into nitrates is called **nitrification.**	Conversion of nitrate back into free nitrogen by denitrifying bacteria is called **denitrification.**

50. How nitrogen depletion from soil is being overcome in nature?

Ans: Nitrogen depletion can be overcome by adding nitrogen fertilizers or it can also be overcome by adding nitrogen by nitrogen fixing bacteria.

51. Define ammonification.

Ans: In this process amino acids are converted into ammonium ions or ammonia.

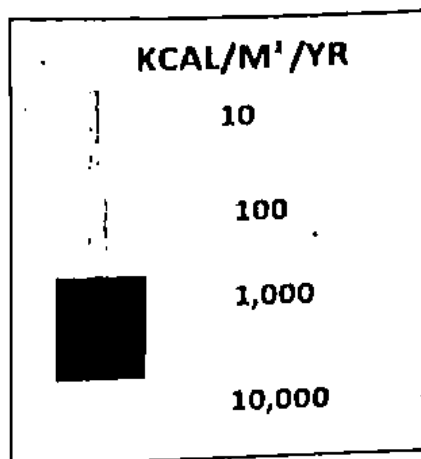
52. Sketch three main steps in nitrogen cycle.

53. Define term biogeochemical cycles.

Ans: Circular movement or recycling of the elements between the organisms and the environment is called biogeochemical cycle.

54. How biogeochemical cycles maintain fertility of soil.

Ans: Biochemical cycle continuously recycle the material especially inorganic substances by decomposing the dead bodies of animals and plants. This cycle make ensure that nutrient remains available to the plants and thus maintain the fertility of the soil.

Flow of energy in food chain of ecosystem

55. Sketch an energy pyramid.

2018

56. Differentiate between biosphere and Niche.

Ans:

Biosphere	Niche
The living part of earth is called biosphere or it is defined as a thin layer of earth in which all living organisms live.	Niche is defined as the ultimate distributional unit within which a species is restrained by the limitations of its physical structure and its physiology.

57. What are abiotic components of an ecosystems? Give examples.

Ans: Non-living components of the atmosphere are known as abiotic or physical components of environment e.g atmosphere, climate, soil & water.

58. What are Producers and Consumers?

Ans: **Producers** are the green photosynthetic plants, which capture and bring light energy into the ecosystem. They are able to manufacture organic food from simpler inorganic substances. They are autotrophoic organisms.

Consumers are all the organisms, which obtain their energy from the dead and decaying plants and animals. They release chemical elements as ions. The main chemical ions are nitrates, ammonia, calcium, phosphates & potassium.

59. Discuss the role of decomposers in an ecosystem.

Ans: Decomposers are mainly the fungi and bacteria, which obtain their energy from the dead and decaying plants and animals. They release chemical elements as ions. The main chemical ions are nitrates, ammonia, phospates, potassium and calcium.

60. Define biosphere and ecosystem.

Ans: **Ecosystem:** The major unit of ecology is ecosystem. The eco part of the word is referred to the environment and the system part means a collection of related parts that function as a unit.

Biosphere: Biosphere is a thin layer of earth in which all living organisms exist. It spreads 8 – 10 kilometers on upper and lower of earth.

61. Define Biotic and A-biotic factors of an ecosystem.

Ans: The ecosystem consists of two basic interacting components, the living or biotic and the physical or abiotic factors. Biotic components consists of animals, plants, fungi, microorganisms etc. Abiotic components are atmosphere, climate, soil and water.

62. Define niche. **(4 times)**

Ans: Niche is defined as the ultimate distributional unit within which a species is restrained by the limitations of its physical structure and its physiology.

63. What is grazing? How grazers affect the texture of soil?

Ans: Many animals like rabbits, goats, sheeps, cows, buffaloes and horses feed on grasses. This mode of feeding is called grazing and these animals are called grazers. Hooves of grazing animals trample the soil into hard layer as a result of which rain water will not penetrate this soil. It runs off from the upper surface removing the topsoil with it. The final result of over grazing is totally barren land.

64. Define synecology.

Ans: The study of the relationship of different communities (grouping of populations) to their environment is called synecology or community ecology.

2019

65. What roles are played by links of food chain.

Ans: Links of a food chain are foods for each other.
Food chain starts with producers which produce food by taking energy from the sun. consumers use the food by eating producers. Decomposers take energy by decomposing producers and consumers.

66. Define the term "Plant Biomass"

Ans: The amount of energy left after plants have met their respiratory needs is net primary production, which shows up as plant biomass.

67. Define grazing. What is the result of over grazing?

Ans: Many animals like rabbits, goats, sheeps, cows, buffaloes and horses feed on grasses. This mode of feeding is called grazing and these animals are called grazers. If too many animals are kept on pasture. The hooves of grazing animals trample the soil into hard layer as a result of which rain water will not penetrate this soil. It runs off from the upper surface removing the topsoil with it. The final result of over-grazing is totally barren land.

68. Define food chain, draw an example of simple food chain.

Ans: Food chain is the transfer of food energy from the source in plants through a series of organisms with repeated stages of eating and being eaten.
Grass → Cow → Man

69. What are metabolic defects? Give one example.

Ans: Metabolic defects lead to structural deviations from the normal. During organogenesis, when various body organs are formed, sometimes, one organ repeated and it can result into abnormal organs or body parts and the individual born is malformed.

In microcephaly the indviduals are born with small skull.

70. Define predation. Give its importance.

Ans: An animal that preys on other animals is predator. A predator is a consumer. The animal that is caught and eaten is the prey. The overall process is called predation. The sizes of populations of predator and prey are related to each other. The size of each population is determined by the size of the other. If the number of prey is large, this leads to an increase in number of predators; as predator feeds upon the prey, the number of prey begins to fall. The number of predators also decreases. Since, they have smaller food supply. As the number of predator decreases, the number prey begins to increase. This food relationship of predator – prey creates a "cycle".

71. Define primary succession.

Ans: During primary succession, an ecosystem is forged from bare rock, sand or clear glacial pool where there is no trace of previous life.

72. What is Biome? Name any four major terrestrial biomes.

Ans: Major types of ecosystems, those that occupy broad geographical regions are called biomes. Each biome consist of a combination of plants and animals in the fully developed climax community and is characterized by a uniform life, form of vegetation such as grass or coniferous trees. Some major terrestrial biomes are forest grassland and desert.

73. Explain Mycorrhiza with an example.

Ans: Mycorrhiza is an association between the roots of plants growing in acid soil and certain fungi. The host is pine, beech or heather and it provides the fungus with an enzyme to digest carbohydrates in leaf litter. In return, the fungus symbiont passes mineral ions from the soil to the host.

2021

74. Define mutualism with two examples.

Ans: This is the type symbiosis in which both the partner get benefit from each other. Lichens and mycrorrhiza are example of mutualism

75. Write down a note on root nodules.

Ans: The legume plants, pea and beans are the hosts to symbiont bacteria, which inhabit the root nodules. The root nodules bacteria fix nitrogen soil air, converting it in to amino acids, which the host uses, in return, host provides bacteria with food and protection.

76. Differentiate between biomass and biosphere.

Ans: Biomass: The weight of all the living organisms in a given population, area or another unit being measured.

Biosphere: The thin shell of air, land and water the earth that support the life is called biosphere.

77. Differentiate between ammonification and nitrification.

Ans:

Ammonification	Nitrification
The micro organisms use the proteins and amino acids and release excess of ammonia or ammonium ion, this process is known as ammonification. The process of ammonia formation is called ammonification	Bacteria in soil oxidize ammonia or ammonium ions and convert them in to nitrates this is called nitrification.

78. What do you mean by nitrogen cycle? How nitrogen of organic material is converted in to NH_3.

Ans: **Nitrogen cycle:** The process by which limited amount of nitrogen is circulated and re circulated throughout the world of living organism is known as nitrogen cycle. Conversion of Nitrogen to Ammonia: The nitrogen compounds like proteins, Nucleic acids and nucleotides are rapidly decomposed by soil dwelling organisms chiefly by bacteria and fungi. The micro organisms use the proteins and amino acids and release excess of ammonia or ammonium ion, this process is known as ammonification.

79. Differentiate between population and community.

Population	Community
Members of a species living in the same area at same time is called population.	Different populations living in an area form a community.

80. Name six major terrestrial biomes.

And: Six major biomes are

i. Forest

ii. Grass land

iii. Wood land

iv. Shrub land

v. semi desert

vi. Desert

81. What is denitrification?

Ans: Process by which nitrates and nitrites are converted back in to atmospheric nitrogen is known as denitirification.

82. What is symbiosis? Name its types.

Ans: Symbiosis is a process in which individuals of different species live tighter and get benefit from each other. It type are mutualism and commensalism.

LONG QUESTIONS OF CHAPTER-25 (ECOSYSTEM) BOARD PAPERS-2011-21

1. Define succession. Explain the different stage of xerosere. (4-times)
2. Describe symbiosis by giving two examples.
3. Explain three major steps of nitrogen cycle. (3-times)
4. Describe parasitism. What is its significance? (3-times)
5. Write note on grazing.
6. Describe predation and parasitism and their significance. (5-times)
7. Define the following terms.
   (i) Habitat (ii) Niche (iii) Food web (iv) Succession
8. Explain briefly interaction between biotic and A-biotic components in an ecosystem.

2016

9 Define ecosystem. Explain its various components (2-times)
10 What is a food web? How it is constructed to show various trophic levels?
11 Discuss nitrogen depletion and its remedies.
12 Define the following terms
   (i) Habitat (ii) Niche (iii) Food web (iv) Climax community.
13 Explain the biotic components of an ecosystem.

OBJECTIVE (MCQ'S) OF CHAPTER-26 (SOME MAJOR ECOSYSTEMS) BOARD PAPERS-2011-21

Aquatic or hydrospheric ecosystem

1. Earth surface is occupied by the marine water ecosystem: (3-times)
(a)70% (b)75% (c)80% (d)85%

2. The earth surface covered with water is about: (2-times)
(a)50% (b)60% (c)70% (d)80%

3. The productivity can be indicated by:
(A) Consumption of CO_2 (B) Evolution of CO_2 (C) Consumption of O_2 (D) Evolution of N_2

Fresh water lakes

4. Decomposers and detritus feeders are only living organisms: (3-times)
(a) Littoral zone (b) Limnetic zone (c) Profundal zone (d) Atmospheric zone

5. The zone where enough light penetrates to support the photosynthesis is:
(a)Littoral zone (b) Limnetic zone (c) Profundal zone (d) Benthic zone

6. Limnetic phytoplanktons includes the: (2-times)
(a) Bacteria (b) Algae (c) Mosses (d) Cyanobacteria

7. The light in this zone is insufficient to support photosynthesis:
(a) Limnetic (b) Profundal (c) Littoral (d) All of these

8. The zone , rich in life , in a fresh water lake is called: (3-times)
(a) Littoral zone (b) Limnetic zone (c) Profundal zone (d) Desert

(2-times)

9. Which of the following is drifting animal:
(a)Insect larvae (b) Protozoa (c) Turtle (d) Snake

10. In aquatic ecosystem near shore zone is called:
(A) Littoral zone (B) Limnetic zone (C) Profundal zone (D) Benthic zone

(2-times)

11. A little light is left to power photosynthesis at the depth of
(a) 500 feet (b) 600 feet (c) 1000 feet (d) 1200 feet

12. Phytoplanktons are drifting
(a)Plants (b) Animals (c) Protozoa (d) Crustaceans

13. Fresh water ecosystem covers less than:
(A) 7 % (B) 5 % (C) 3 % (D) 1 %

Intervention of man in aquatic ecosystem

14. The befouling of the air by anything that may be harmful to living organism is:
(a) Water pollution (b) Soil pollution (c) Air pollution (d) Noise polluttion

15. Some detergent contains a lot of:
(A) Sulphur (B) Carbon (C) Phosphate (D) Carbonates

16. Scum in eutrophicaiton is formed by:
(A) Blue green algae (B) Fungi (C) Bacteria (D) Virus

Terrestrial or lithosheric ecosystem

17. In terrestrial plants, the major mechanical stress is imposed by (2-times)
(a)Gravity (b) Temperature (c) Wind (d) Soil

Temperate deciduous forests

18. The average rainfall in temperate deciduous forest is between: (3-times)
(a)600-1500mm (b)650-1500mm (c)700-1500mm (d)750-1500mm

19. Temperate deciduous forests are located in Pakistan at ________:
(A) Shogran (B) Chilas (C) Mianwali (D) Sindh

20. Alpine coniferous forests are found on high:
(A) Latitudes (B) Longitudes (C) Altitudes (D) Slopes

Coniferous alpine and boreal forests

21. Coniferous forests located at high altitude are: (5-times)
(a) Alpine (b) Boreal (c) Taiga (d) Arctic

22. Which one is not a desert: (2-times)
(a)Thal (b) Sahara (c) Thar (d) Taiga

23. Northern coniferous forests are called:
(A) Tundra (B) Taiga (C) Alpine (D) Boreal

The grass land ecosystem

24. The grass lands of tropical climate have woody trees are called: (2-times)
(a) Prieries (b) Boreals (c) Savana (d) Tundra

25. The rate of primary production is about 700 – 1500 g/m^2 annually in:
(a) Desert (b) Tundra (c) Tropical glassland (d) Temperate grass land

26. Layer is a characteristics of (3-times)
(a) Tundra (b) Grass land (c) Taiga (d) Desert

27. In temperate grassland the rate of primary production is about (2-times)
(A) 700-1400g/m^2 (B) 700-1600g/m^2 (C) 700-1800g/m^3 (D) 700-1500g/m^2

Desert ecosystem

28. Desert ecosystem occurs in region, where annual rain falls is less than:
(a) 25-50 cm (b) 5-10cm (c) 15-20cm (d) 250-270cm

29. **In Sindh, the desert ecosystem is called:**
(a) Thar (b) Thal (c) Sahara (d) Gobi

30. **Average rain fall in desert ecosystem is:** **(2-times)**
(a) 10-20 inches (b) 30-40 inches (c)50-60 inches (d)70-80 inches

31. **In Pakistan the dessert ecosystem of western Punjab is:** **(3-times)**
(a) Cholistan (b) Rajistan (c) Thar (d) Thal

32. **Which biome has been increased in area by human activities?**
(a) Grass land (b) Savanna (c) Coniferous (d) Desert

33. **Deserts generally occur in region where annual rainfall is less than:**
(A) 25—50 cm (B) 5-10 cm (C) 250-270 cm (D) 15-20 cm

Tundra ecosystem

34. **What will be the age of willow tree 10 centimeter high and 7 centimeter in diameter?**
(a)40 years (b)50 years (c)60 years (d)70 years

35. **Which one is the most fragile ecosystem?** **(3-times)**
(a)Grass land (b) Wood land (c) Tundra (d) Savanna

36. **Mountains of Kara-Koram and Hindukush are the regions, also called as:**
(A) Deserts (B) Grass land (C) Tundra (D) Taiga

37. **The Arctic tundra stretches across Northern America, Northern Europe and:** **(2 times)**
(A) Siberia (B) Cyprus (C) Morocco (D) Algeria

2018

38. ***Cacti* and *Euphorbia* are the desert plants which store water in their:**
(a) Fleshy leaves (b) Fleshy buds (c) Fleshy stems (d) Fleshy roots

39. **The scientific name for rhesus monkey is:**
(a) *Macaca mullata* (b) *Taxus baccata* (c) *Felis catus* (d) *Solenorctor tibetanus*

40. **A dominant plant of the deciduous forest is the:**
(a) Cactus (b) Euphorbia (c) Acacia (d) Taxus baccata

41. **Desert ecosystem of Mianwali and Bhakkar is called:**
(a) Thal (b) Thar (c) Cholistan (d) Sahara

42. **The producers in limnetic zone are:**
(a) Amoebae (b) Cyanobacteria (c) Hydrilla (d) Crustanceans

2019

43. **Drifting or floating microscopic organisms are called:**
(A) Phytoplanktons (B) Zooplanktons (C) Planktons (D) Photons

44. **Andropogon, Stipa and Panicum are found in ecosystem called.**
(A) Grass land (B) Desert (C) Tundra (D) Coniferous

2021

45. **The Ecosystem in which Soil is Grayish brown, very fertile and rich in organic matter is:**
(A) Coniferous Forest (B) Grassland
(C) Temperate Deciduous Forest (D) Tundra

46. **Phytoplankton includes cyanobacteria which serve as**
(A) Decomposers (B) Feeders (C) Crustaceans (D) Producers

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	C	A	C	B	D	B	A	B	A	B	A	D	C
15	16	17	18	19	20	21	22	23	24	25	26	27	28
C	A	C	D	A	C	A	D	B	C	D	B	D	A
29	30	31	32	33	34	35	36	37	38	39	40	41	42
A	A	D	D	A	B	C	C	A	C	A	D	A	B
43	44	45	46										
C	A	C	D										

SHORT QUESTONS AND ANSWERS OF CHAPTER-26 (SOME MAJOR ECOSYSTEMS) BOARD PAPERS-2011-21

Short questions

1. What is climate? And also give its role. **(2-times)**

Ans: Climate refers to over all patterns of weather that prevails from year to year even centuries in a particular region.
It plays an important role in the distribution of animal and plant life.

2. Differentiate between climate and weather **(7-times)**

Ans:

Climate	Weather
Climate refers to over all patterns of weather that prevails from year to year even centuries in a particular region.	**Weather:** it refers to short term fluctuations in temperature, humidity, cloud cover, wind and precipitation over periods of hours or days.

Aquatic or hydrospheric ecosystem

3. Define hydrospheric ecosystem.

Ans: An ecosystem present in water where living and non living components exchange their material and transfer of energy also takes place within water.

4. Name four common features to aquatic ecosystem.

Ans: Four features of aquatic ecosystem are

i. Temperature
ii. Absorption of energy/ light
iii. Nutrients
iv. Abundant water with suitable temperature.

5. Define hydrospheric ecosystem.

Ans: Ecosystem in water where living and non living components exchange material and transfer of energy also takes place within water.

6. How animals and plants conserve water in terrestrial environment.

Ans: Plants conserve their water by following methods

a. They have water storing tissues
b. They have reduced leaves or their leaves are modified into spines to reduce water loss
c. They have thick cuticle
d. They have sunken stomata

Productivity of ecosystem

7. How the productivity of an aquatic ecosystem can be determined? (2-times)

Ans: The productivity of an aquatic ecosystem is basically determined by the light and nutrients. Light intensity and quality varies with depth so the primary productivity also varies with light.

Fresh water lakes

8. Characterize profundal zone of fresh water lakes. **(2-times)**

Ans: Here light is insufficient to support photosynthesis. This area is mainly nourished by detritus. Decomposers and detritus feeders such as snails and certain insect larvae, bacteria, fungi and fishes inhabit it.

9. Compare phytoplanktons with zooplanktons. **(3-times)**

Ans:

Phytoplanktons are called drifting plants, it includes photosynthetic protists, bacteria and algae.	**Zooplanktons** are called drifting animals such as tiny protozoa and crustaceans.

10. Name three zones in lake ecosystem. **(2-times)**

OR Name different zones of freshwater lakes. **(2-times)**

Ans: Zones of Lake Ecosystem are

i. Littoral zone
ii. Limnetic zone
iii. Profundal zone

11. Give the characteristics of limnetic zone of fresh water ecosystem. (2-times)

Ans: In this zone enough light present to support photosynthesis. Here phytoplanktons include cyanobacteria (as producers). These are eaten by protozones and small crustaceans, which in turn consumed by fishes.

12. What are planktons? Give their two types. **(2-times)**

Ans: Planktons are drifting or free-living organisms which are mainly microscopic. These are of two types

i. zooplanktons
ii. phytoplanktons

13. Write down the types of living organisms found in limnetic zone.

Ans: Living organisms of limentic zone are Cyanobacteria, protozoa, small crustaceans and fishes.

14. Differentiate between limnetic zone and profundal zone.

Ans:

Limentic zone	Profundal zone
In this zone adequate or enough light penetrates to support photosynthesis. In this zone mainly cyanobacteria, protozoa, small crustaceans and fishes are present.	In this zone light is insufficient to support photosynthesis. This area is mainly nourished by detritus that fall from littoral and limnetic zone. Here mostly decomposers and detritivores like snail, certain insect larvae, bacteria, fungi and fish inhabit.

15. Name any two zones of fresh water late.

Ans: Profundal zone and limnetic zone.

16. Describe animal life in profundal zone.

Ans: Decomposers and detritus feeders such as snails and certain insect larvae, bacteria, fungi and fishes inhibit it.

Intervention of man in aquatic ecosystem

17. What is eutrophication? Write its effect on animal life. **(3-times)**

Ans: This is the natural process of extensive enrichment of water nutrients by which large amount of living organic matter grows in the lake. Eutrophication causes deficiency of oxygen so that animal life is killed.

18. What are algal blooms? Give their effects on aquatic life.

Ans: Excessive growth of blue green algae due to high concentration of phosphates and nitrates in water is called algal blooms.

It can cause deficiency of oxygen in water and leads to animal death.

19. What is algal bloom?

Ans: In nutrient rich aquatic ecosystem (lake) there is rich growth of algae on water surface, which prevent penetration of light at depth. This rich growth of algae is called algal blooms

Terrestrial or Lithosheric ecosystem

(3-times)

20. What is composition of air in terrestrial ecosystem?

Ans: In terrestrial ecosystem air is in constant motion, so its composition is more uniform. The amount of O_2 and CO_2 in air is much more constant and most beneficial for terrestrial ecosystem.

(3-times)

21. Give two adaptations for terrestrial ecosystem

Ans: Adaptations to land habitat are

i. Evolution or formation of supporting tissues.
ii. Conservation of water

22. Name two factors which influence life on land.

Ans: Two factors which can influence life on land are

i. Temperature ii. Air

(2-times)

23. Write two adaptations for terrestrial ecosystem.

Ans: Two adaptations for terrestrial ecosystem are

i. Conservation of water
ii. Presence of supporting tissues

Division of terrestrial ecosystem

(3-times)

24. Give four names of major terrestrial ecosystem in Pakistan.

Ans: Major terrestrial ecosystems of Pakistan are

i. Temperate deciduous forest
ii. Coniferous alpine and boreal forest
iii. Grassland ecosystem
iv. Desert ecosystem.
v. Tundra ecosystem

25. Write major ecosystems in Pakistan. OR Enlist major ecosystems in Pakistan. (2 times)

Ans: Major ecosystems of Pakistan are

a. Temperate deciduous forests
b. Coniferous alpine and boreal forests
c. Grassland ecosystem
d. Desert ecosystem
e. Tundra ecosystem

Temperate deciduous forests

26. Define temperate deciduous forest. Mention various such forests in Pakistan.

Ans: These forests are originally present in cool moist habitat. But during dry season they shed their leaves because they cannot get enough water. So they are called temperate deciduous forests.

In Pakistan their location is Neelam valley and Shogran.

27. What is average rainfall in temperate deciduous forests?

Ans: The average rain fall in temperate deciduous forest is 750mm to 1500mm/annum

28. Differentiate between altitude and latitude.

Ans:

Altitude means height from sea level toward the high mountain as we go away from sea level towards high mountains the altitude increases. (The absolute height of a location usually measured from see level)	**Latitude** means the distance from equator towards poles as we go away from equator towards poles latitude increases.

29. Enlist some dominant plants that occur in temperate deciduous forest.

Ans: Dominant plants of temperate deciduous forest are *Taxus baccata, Pinus wallichiana, Berbris lyceum*. Some grasses, ferns. Many mosses and lichens also form ground layer.

Coniferous alpine and boreal forests

30. Differentiate between alpine and boreal forests. (10-times)

Ans:

Coniferous forests located at high altitude are called **alpine forests.**	Coniferous forests located at high latitudes are called **Boreal forests.**

31. What is Taiga? (2-times)

Ans: Northern coniferous forests are called taiga.

32. What are kinds of coniferous forests and where they located?

Ans: Kinds of coniferous forest are:

1. **Alpine forests**
2. **Boreal forests**

In Pakistan coniferous forests are located at Upper Kaghan, Dir, Chilas, Malam Jabba and in Swat valley

33. Write the human impact on coniferous forests and boreal forests. (2-times)

Ans: Due to severity of climate and remoteness most of the coniferous forests remained undisturbed, but these forests are major source of lumber for construction so these forests have been cleared in the world.

The grass land ecosystem

34. What is the difference between savanna and prairies? (3-times)

Ans:

Grass land ecosystem present in temperate climate is called prairies. Grass land without woody trees is also known as **prairies.**	Grass land ecosystem with woody plants is called **Savanna.**

35. What is layering in grassland? (2-times)

Ans: Due to difference in height of grasses layering is formed. It is characteristic of grass land ecosystem. Three layers are formed. Tall grasses form first layer, mid high grasses form second layer and third layer is formed by short grasses.

36. Describe the animal life of grass land ecosystem. (3-times)

Ans: Animals of deserts are mostly nocturnal (they hide during day and come out during night), they do so to avoid too much heat and water loss. Desert animals include horned lizards, snakes and other reptiles, Mammals include kangaroo, rats. Birds include burrowing owl.

37. Write the rate of primary production of temperate and sub humid tropical grassland.

Ans. Productivity of temperate grass land is = 700 -1500 g/m^2 and productivity of sub humid tropical grass land is 4000 g/m^2.

38. Give productivity in sub humid tropical grass land.

Ans: The productivity of sub humid tropical grass land is more than 4000 gm/m^2.

39. Write down soil conditions of grassland ecosystem. (2-times)

Ans: The soil moisture is limited on account of low precipitation and high evaporation. Upper soil layer in which grasses are rooted is normally moist but deeper layers are constantly dry. The soil of grass land is basically impermeable with excessive salinity.

40. What are graminoids, in which biome they exist?

Ans: Gramonoids are grasses or grass like plants which are present in grass land ecosystem.

Desert ecosystem

41. Give the location of desert biomes. Write the name of desert in western and southern Punjab. (4-times)

Ans: Thal is located in westren Punjab while Cholistan is located in Southern Punjab.

42. Define Desertification.

Ans: Conversion of cultivated or fertile soil into barren land or into desert form is called desertification.

43. Give two causes of famine in sahel in Africa.

Ans: The two main reasons of famine in Sahel in Africa are

i. 25 years of below average rain fall.

ii. Rapid increasing human population.

Tundra ecosystem

44. What is the effect of human impact on Tundra Ecosystem? (4-times 2018)

Ans: Tundra is perhaps the most fragile of all biomes because of its short growing season. Human activities in the tundra leaves scar that persists for centuries. Fortunately for the tundra inhabitants, the impact of civilization is localized around oil drilling sites, pipelines, mines and military bases.

45. What type of animal life is found in tundra? (3-times)

Ans: Standing pools provides habitat for mosquitoes. There may be ducks and geese. The tundra vegetation supports lemmings, which are eaten by wolves, snowy owls, arctic foxes and even grizzly bears.

46. Give location of tundra ecosystem in Pakistan.

Ans: Tundra ecosystem in Pakistan is present across mountain above timber line such as Karakoram and Koh Hindu Kush.

Human and ecosystem

47. What is the effect of human impacts on desert ecosystem?

Ans: While human activities are reducing the extent of many biomes, they are causing the spread of deserts a process is called desertification. The loss of productivity of ecosystem is nearly irreversible and massive famines are result of human activities.

48. Give types of organism present in profundal zone.

Ans: Organisms of profundal zone are as follows:

Decomposers and detritus feeders, such as snails and certain insect larvae, bacteria, fungi and fishes.

49. What are phytoplankton and zooplankton?

Ans: In littoral zone of fresh water lakes, the microscopic organisms called plankton can be divided into two groups.

1- Phytoplankton (Greek 'drifting plants"): these include bacteria and algae.

2- Zooplankton (Greek "drifting animals"): Such as protozoa & tiny crustaceans.

50. Define productivity of an ecosystem. (2-times)

Ans: The productivity of an ecosystem can be defined as "It is directly related to the rate of photosynthesis of producers i.e their consumption of carbon dioxide and evolution of oxygen.

51. Write the consumers of grassland.

Ans: The consumers of grassland ecosystem are as follows:

Dominant species are herbivores ; invertebrates including insects are very numerous, e.g. grasshoppers. Secondary consumers are reptiles, amphibians and mammals.e.g. lizards, toads and turtles prey on insects; foxes and wolves among mammals are very common.

52. Describe role of bacteria in eutrophication.

Ans: Producers like blue-green algae form a scum on the lake surface, depriving the submerged plants of sun light; as a result they die. The dead plant bodies are decomposed by bacteria, untilizing the oxygen present in the water, deprived of oxygen,. fish, snails and insect larvae die and their decaying bodies fuel more bacterial growth, further depleting oxygen. Even without oxygen, certain bacteria that produce foul smelling gases thrive. Although it is full of life and nutrients, polluted lake smells bad. Most of the trophic levels including the fish are eliminated and the bacteria and blue-green alge dominate the community.

53. What is productivity of an ecosystem write the names of its types. (2-times)

Ans: The productivity can be indicated by consumption of CO_2 and evolution of oxygen in the process of photosynthesis.

Types: There are following two types of "productivity of autotrophs such as productivity of plants is called primary productivity."

Prodcutivity of heterotrophs such as animals is called secondary productivity.

54. What is profundal zone? Give its one character.

Ans: This is the zone of fresh water lake where light is insufficient to support photosynthesis. The organisms of this zone are nourished by detritus that falls from the littoral and limnetic zone and by incoming sediment.

55. Differentiate between hydrospheric and fresh water ecosystems.

Ans:

Hydrospheric ecosystem	Freshwater ecosystem
Hydrospheric ecosystem is a "system in water where living and non-living components exchange materials and transfer of energy also takes place within water." Hydrospheric or aquatic ecosystem can easily be divided into freshwater and marine (salty) water.	Fresh water ecosystem is a type of hydrospheric ecosystem which covers only 1% of the earth. Fresh water lakes vary tremendously in size, depth and nutrient content, including distinct life zones and temperature stratification. The lake ecosystem can be divided into three distinct zones i.e 1. Littoral zone 2. Limnetic zone 3. Profundal zone

56. What is desertification? Quote one example.

Ans: While human activities are reducing the extent of many biomes, they are causing the spread of deserts, a process called desertification.

Example: A dramatic example is occurring in the sahel, which borders the southern edge of the sahara desert in Africa. Twenty five years of below average rainfall, coupled with rapid growth of the human population have caused a steady southward spread of desert.

57. Compare littoral zone with limnetic zone.

Ans:

Littoral zone	Limnetic zone
1- In this zone water is shallow and plants find abundant light, anchorage and adequate nutrients from the bottom sediments.	1- In this zone enough light penetrates to support photosynthesis.
2- Phytoplankton include photosynthetic protista, bacteria and algae.	2- Here phytoplankton includes cyanobacteria (blue green algae) which serves as producers.
3- Zooplankton are protozoa and tiny crustaceans.	3- Zooplankton are protozoa & small curustaceans.

58. Differentiate between prairies and savanna. **(2-times)**

Ans:

Prairies	Savanna
"The grasslands which do not have woody plants are called as prairies. Prairies are present in temperate climates e.g prairies of north America, Pampas of Argentinia.	"The grasslands which have woody trees are called savanna." Savanna are found in tropical climates.

2019

59. Write down the average rain fall of grassland and temperate deciduous forest.

Ans: Annual rainfall of grassland is about 250 to 750 mm (10-30 inches). Average rainfall of temperature deciduous forests is between 750-1500 mm.

60. How did plants and animals adapt land habitat?

Ans: Both plants and animals have evolved supporting tissues like vascular bundles (xylem-phloem) in plants and skeleton in animals to support them on land against the force of gravity.

Plants and animals evolved various methods to conserve water in their body.

61. List the name of eight cities of Pakistan where desert ecosystem occurs.

Ans: Cities of Pakistan where desert occurs are:

1. Mianwali
2. Bukhar
3. Fort Abbas
4. Bahawal Nagar
5. Yazman
6. Bahwal Pur
7. Khan Pur
8. Rahim Yar Khan.

62. List four adaptations in plants and animals for terrestrial ecosystem.

Ans: Plants and animals shifting from water to land developed various types of adaptations for land habitat e.g.

1. **Supporting tissues:**
(i) Vascular bundles (xylem & phloem) in plants.
(ii) Skeleton in animals.
(iii) Conservation of water: (homeostasis)
(iv) Temperature regulation by bark & skin.

63. What is limnetic zone, mention its life.

Ans: In this zone enough light penetrates to support photosynthesis. Here phytoplankton includes cynobacteria (blue green algae) which serve as producers. These are eaten by protozoa and small crustaceans, which in turn are consumed by fishes.

64. Write about two factors which influence life on land.

Ans: Factors which influence life on land are given below:
Temperature: Like water, favourable temperature are very unevenly distributed on land in place and time. On poles, the average temperature is below freezing. In temperate zones, only during certain seasons of the year it is quite favourable, but in tropical zones uniformly warm, moist climate is present.
Air: In terrestrial ecosystem, air is in constant motion. So its composition is more uniform. The amount of O_2 and CO_2 in air is much constant and most beneficial to terrestrial ecosystem.

2021

65. Define grass land ecosystem. Where grass land ecosystems are found in Pakistan.

Ans: In grass land ecosystem grasses are the dominant plants in Pakistan grass land ecosystem found in Gilgit and Kashmir, Wazirlastan, lower Dir and Chitral.

66. Write animal life found in near-shore zone of a fresh water lake.

Ans: Animal life near shore zone of fresh water lake includes invertebrates like (small crustaceans, insect larvae, snails, flat worms, hydra) vertebrates includes frogs, aquatic snakes, turtles.

67. What is taiga? What conditions do animals face residing there?/ Briefly describe conditions of Taiga?

Ans: Northern coniferous forests are called **Taiga.**
Conditions in taiga are harsher than those in temperate deciduous forest. The winters are longer and colder, and growing season is shorter.

68. Comapere litoral zone with limnetic zone./ Give at least two differences between Limnetic zone and Littoral zones of fresh water lake.

Ans:

Litoral zone	Limentic zone
1. In this zone the water is shallow and plants find abundant light, anchorage adequate nutrients from bottom sediments. 2. Plants in litoral zone communities are most diverse, water lilies and entirely sub merged vascular plants and algae flourish at the deepest zone. Zooplanktons and phytopalnktons also found in this zone.	1. In this zone enough light penetrates to support photosynthesis. 2. Here phytoplanktons include cyano bacteria serve as producers. These are eaten by protozoans and small crustaceans, which in turn consumed by fishes.

69. How temperate deciduous forests were affected by human impact?

Ans: On temperate deciduous forests large mammals such as black bear, deer, wolves and mountain lions were formerly abundant, but the predators have been largely wiped by humans, Need of lumber and use in agriculture has reduced many deciduous forests from the world.

70. Write down note on productivity.

Ans: Productivity can be indicated by consumption of carbon di oxide and evolve of oxygen in the process of photosynthesis.

Productivity of aquatic ecosystem is basically determined by the light and minerals. Light intensity and qualities varies with the water depth, so the primary productivity also varies with light. The amount of nutrients form also changes with season. Productivity also varies from zone to zone.

71. Explain life in limnetic zone.

Ans: Here light is insufficient to support photosynthesis. This area ia mainly nourished by detritus falls from the litoral zone and by incoming sediments. Decomposers and detritus feeders such as snails and certain insect larvae, bacteria, fungi and fishes inhabit it.

72. Distinguish coniferous Alpine and Coniferous Boreal forests.

Ans:

Coniferous alpine forests	Coniferous boreal forests
Coniferous forests located at high altitudes are called Coniferous boreal forests.	Coniferous forests located at high latitudes are called Coniferous boreal forests.

73. Differentiate between zooplanktons and phytoplanktons.

Ans

Zooplanktons	Phytoplanktons
These are drifting animals, these include protozoa and crustaceans.	These are the drifting plants; these include photosynthetic protists, bacteria and algae.

LONG QUESTIONS OF CHAPTER-26 (SOME MAJOR ECOSYSTEMS) BOARD PAPERS-2011-21

1. Write a note on algal bloom. (2-times)
2. Write a note on wild life and algal bloom.
3. Explain any two life zones in ecosystem of fresh water lakes.
4. Describe the grassland ecosystem. (3-times)
5. Describe three different zones in the fresh water lake ecosystem.
6. Write note on tundra ecosystem. (2-times)
7. Discuss grassland ecosystem. (2-times)
8. Explain the phenomena of eutrophication.

OBJECTIVE (MCQ'S) OF CHAPTER-27 (MAN & HIS ENVIRONMENT) BOARD PAPERS-2011-21

Renewable and Non-Renewable resources

(3-times)

1. It is not fossilized fuel
(a) Lignite (b) Peat (c) Natural gas (d) Oil

Renewable resources

2. The upper layer of earth's crust is called:
(a) Ecology (b) Topography (c) Soil (d) Synecology

(3-times)

3. Total area of the world under cultivation is
(a)9% (b)10% (c)11% (d)12%

4. In dams the power used to derive generators to produce electricity is called:
(a) Wind power (b) Nuclear power (c) Hydroelectric power (d) Tidal power

5. The percentage of fresh water in lakes, streams and rivers is (2-times)
(a)1% (b)2% (c)3% (d)11%

6. The nuclear Power Station can last only for about: (2-times 2018)
(A) 10 Years (B) 20 Years (C) 30 Years (D) 40 Years

7. A treasure of all types of resources essential to maintain life on earth is:
(A) Environment (B) Water (C) Land (D) Sun

8. Utilization of water in industry is:
(A) 70% (B) 80% (C) 85% (D) 90%

9. The cheapest and non-pollutant source of energy is the:
(A) Hydroelectric Power (B) Wind Power (C) Tidal Power (D) Nuclear Energy

10. Which of the following is a renewable resource?
(A) Coal (B) Land (C) Petroleum (D) Oil

11. The % age of CO_2 in air is:
(A) 79% (B) 0.03% (C) 20% (D) traces

Population, food and need of population control

12. The study of human populations and factors that affect them is called:
(a) Calligraphy (b) Demography (c) Chromatography (d) Homography

13. At the time of independence, the population of Pakistan was about:
(a) 32.5 billion (b)32.5 million (c)150 million (d)160 million

Deforestation and A-Forestation and importance of Forests

14. Which of the following act as environmental buffer? (3-times)
(a)Desert (b) Oceans (c) Forests (d) Lakes

15. The destruction of forests leaves the soil barren and this is called:
(A) Deforestation (B) Forestation (C) Aforestation (D) Reforestation

16. Establishment of new forests, where no forests existed before is called:
(A) Deforestation (B) Desertification (C) Reforestation (D) Afforestation

Pollution (air pollution, Green house effect, Acid Rain)

17. Air is being polluted rapidly due to industrialization and:
(a) Urbanization (b) Pollution (c) Deforestation (d) Automobiles

18. As chlorofluorocarbons rise to the atmosphere, the ultraviolet rays release:
(a) Flourine (b) Chlorine (c) Carbon (d) Hydrogen

19. **Ozone molecules is made up by binding of three atoms of** **(3-times)**
(a) Carbon (b) Hydrogen (c) Nitrogen (d) Oxygen

20. **Stone monuments like "Taj Mahal" are being aroded due to "stone cancer" by:**
(a) Acid rain (b) Greenhouse effect (c) Eutrophication (d) Radiation

21. **An unusual type of pollution is** **(3-times)**
(a)Water pollution (b) Soil pollution (c) Noise pollution (d)Radiation pollution

22. **The ozone layer has developed a hole over the:**
(a)Arctica (b) Equator (c) Antarctica (d) Tropics

23. **The decline in thickness of ozone layer is caused by increasing level of (2-times)**
(a) Hydrocarbons (b) Nitrocarbons (c)Chlorofluorocarbons (d) Florocarbons

24. **Ozone in the upper layer of atmosphere that filters** **(2-times)**
(a) IR radiation (b) UV radiation (c) βradiation (d) γ-radiation

25. **The chemical waste from industry is called:**
(A) Pollution (B) Effluent (C) Toxins (D) Pollutant

Inseticides & herbicides and fertilizers

26. **Agrochemicals used in agriculture are commonly called pesticides which include:**
(a)Insecticides and fungicides (b) Fungicides and Herbicides
(c)Insecticides, fungicides and Herbicides (d) Insecticides only

27. **The chemical, which destroys agricultural pests or competitors is called: (2-times)**
(a) Bio pesticide (b) Germicide (c) Herbicide (d) Pesticide

Health and diseases

28. **An infectious disease which can be transmitted to other is:**
(a) Beri-Beri (b) Anaemia (c) Diphtheria (d) Goiter

29. **Which one of the following is responsible for headache, brain damage and death:** **(3-times)**
(a)Oxides of nitrogen (b) Lead compounds (c) CFCs (d) Carbon monoxide

30. **Mental illness causes the** **(2-times)**
(a) Goiter (b) Anemia (c) Alzheimer (d) Scurvy

31. **Disease in living organism caused by parasites is called:**
(A) Plaques (B) Infestations (C) Influxes (D) Swarms

2018

32. **A single chlorine atom can react with ultraviolet rays and destroy as many as:**
(a) One million O_3 molecules (b) Three millions O_3 molecules
(c) Four millions O_3 molecules (d) Six millions O_3 molecules

33. **Water present in form of frozen ice caps is:**
(a) 1% (b) 2% (c) 3% (d) 4%

34. **All of the following diseases are related to nutritional deficiency except:**
(a) Alzheimer (b) Anemia (c) Beriberi (d) Scurvy

35. **The increase of environmental temperature due to high amount of CO_2 is known as:**
(a) Global warming (b) Acid rains (c) Ozone depletion (d) stone cancer

36. **The colour of the pure form of ozone (O_3) is:**
(a) whitish (b) yellowish (c) bluish (d) greenish

37. About 95% of our daily energy requirement are filled by:
(a) Nuclear energy (b) Hydroelectric power (c) Geothermal energy (d) Fossil fuel

2019

38. Establishment of new forests where no forest existed previously:
(A) Afforestation (B) Reforestation (C) Deforestation (D) Forestation

39. The decline in thickness of ozone layer is due to increasing level of:
(A) CO_2 (B) CFC_S (C) Hydrogen (D) Hydrocarbons

40. The two main causes of air pollution are industrialization and:
(A) Automobiles (B) Urbanization (C) Deforestation (D) Overgrazing

41. Oxides of Nitrogen cause:
(A) Lung Cancer (B) Cough (C) Brain damage (D) Cholera

42. Ozone depletion is commonly caused by:
(A) CFCs (B) CO_2 (C) smoke (D) smog

2021

43- All are causes of Green House effect except:
(A) Deforestation (B) Industrialization
(C) Over Urbanization (D) Reforestation

44- Which of the following is a renewable resource?
(A) Oil and air (B) water and oil (C) oil and gas (D) air and water

45- The driving force behind all of natural cycles is
(A) Sun (B) Air (C) Water (D) Soil

46- The atmosphere gas behaves like glass sheet of green house is
(A) Oxygen (B) Hydrogen (C) Carbon dioxide (D) Nitrogen

47- Which of these is a greenhouse gas?
(A) Sulphur dioxide (B) Nitric oxide (C) Carbon monoxide (D) Carbon dioxide

48- The cause of acid rain is:
(A) Oxides of hydrogen (B) NO2and SO2
(C) Oxides of potassium (D) Oxides of magnesium

49- CFCs are produced by
(A) Fans (B) Industrial machines
(C) Air conditioners and Refrigerators (D) Aeroplanes

ANSWERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14
B	C	C	C	A	C	A	D	A	B	B	B	B	C
15	16	17	18	19	20	21	22	23	24	25	26	27	28
A	D	D	B	D	C	D	C	C	B	B	C	D	C
29	30	31	32	33	34	35	36	37	38	39	40	41	42
D	C	B	A	B	A	A	C	D	A	B	A	B	A
43	44	45	46	47	48	49							
D	D	A	C	D	B	C							

SHORT QUESTIONS AND ANSWERS OF CHAPTER-27 (MAN & HIS ENVIRONMENT) BOARD PAPERS-2011-21

Renewable and Non-Renewable resources

1. Name any three factors which upset the balance of nutrient cycle.

Ans: Three factors which can upset nutrient cycle are
- i. When insufficient food is produced.
- ii. When more food is produced than consumed.
- iii. Decayed nutrients are not returned to the ground.

2. What are renewable and non-renewable resources? Give examples.

Ans: Renewable resources are those which can be recycled and can be reused or can be regenerated are called renewable resource e.g., Water, air, wild life.
The resources which cannot be recycled or regenerated or cannot be reused are called renewable resources. They are present in limited amount e.g., Petroleum, natural gas, coal.

3. Explain briefly nutrient cycle in nature. **(3-times)**

Ans: In nature there is no such thing as waste, dead material decay and become food for other living things. This food is consumed or decays and becomes food again. This is the nutrient cycle. The process that supplies food to living things.

Renewable resources

4. What is meant by geothermal energy? Explain. **(2-times)**

Ans: The natural heat energy trapped underground is called geothermal energy. Geothermal energy is free and can last for a long time. Sites of geothermal energy are usually located in areas away from their consumers. This makes the harnessing of geothermal energy at these sites impracticable.

5. Define tidal barrage. **(2-times)**

Ans: A tidal power station consists of a long barrier called a tidal barrage.

6. Define wild life. **(2-times)**

Ans: Non domesticated animals and non cultivated plants are known as wild life.

7. Mention any four ways in which we can save energy. **(4-times)**

Ans: We can save energy as
- i. Switch off all the electric appliances when not in use.
- ii. Prefer public transport instead personal transport.
- iii. Minimum use of air conditioners.
- iv. Use of energy efficient engines or machines.

8. Write shortly about fossil fuels. OR What are fossil fuels? **(2-times)**

Ans: They are called fossil fuels because they are remains of the animals and plants of past which became buried due to environmental hazards. Fossil fuel fulfills the 95% of our energy requirements. These are present in limited quantity on earth and they will be soon or later exhausted. It includes natural gas, petroleum and coal.

9. Describe abuses of land. **(2-times)**

Ans: Land abuses are
- i. Soil erosion
- ii. Land desertification
- iii. Destruction of ecosystem
- iv. Mineral deficiency due to various activities

10. Define hydroelectric power. **(3-times)**

Ans: Falling water at dams turn turbines which derive the generators to produce electricity which is known as hydroelectric power.
Electricity produced by the falling water at dams is called hydroelectric power.

11. Define soil and give its role.

Ans: Upper most layer of earth crust is called soil.
Role: It provides nutrients to the plants.
It is the medium where plants grow.
Many types of micro flora and fauna grow in the soil. **(4-times)**

12. Define biodiversity and forest.

Ans: Variety or kind of organisms in an area is called biodiversity.
Forest is a place where a large number of vegetation grows under natural conditions. **(5 times)**

13. What is soil?

OR Define soil. What are its basic constituents?

Ans: Upper most layer of earth crust is called soil.
Constituents of soil are soil particles, soil water, soil and inorganic matter and soil organisms.

14. Give impact of mismanaged agricultural ecosystem.

Ans: Due to mismanaged agricultural ecosystem, soil is continuously mismanaged, soil is also depleting in nutrients. Poor agricultural practices also results in soil erosion, soil pollution due to excessive use of pesticides.

15. Define wild life.

Ans: Non cultivated plants and non domesticated animals are called wild life.

16. What do you know about nuclear energy?

Ans: Nuclear energy is obtained from nuclear fuels by nuclear fission. In nuclear power station, large amount of heat is generated by nuclear fission, which takes place in nuclear reactor. The heat energy is then used to convert water into steam, which derives steam turbines for generating electricity.

17. Explain ocean thermal energy as renewable source of energy.

Ans: In oceans especially tropical regions, temperature of surface water is about 25C° and that at the depth of few hundred meters only 5C°. This develops an ocean thermal gradient and heat is conducted from region of higher to lower temperature. Man has developed the technology to use thermal gradient to derive a turbine for electricity generation but this may also disturb the marine ecosystem.

Degradation and depletion of resources

18. How degradation and depletion of resources occur on planet earth.

Ans: The increase in population requires more land for home, industry, recreation and roads and more food requirements. Over exploitation of resources can degrade and deplete resources.

Population, food and need of population control

19. Define demography. Give its importance. **(5-times)**

Ans: Study of the human population is called demography.
Importance: We can measure human population growth rate; demand of resources, birth and death rate can be measured, by this method.

20. Define population and populants (2-times)

Ans: A group of organisms of same species living at same place at same time is called population.
Members of a population living in an area are called populants.

21. What is population explosion? **(3-times)**

Ans: Abrupt increase in population is called population explosion.

22. Give consequences of population increase.

Ans: The consequences of population increase are as follow

a. It result more crime violence and social diseases.
b. Starvation through lack of sufficient food. Populations will outstrip food supply.
c. Destruction of countryside plants, animals and wildlife.

23. Only name the factors which affect population.

Ans: Food, shelter, availability of resource (water, air, energy etc) health or medical facilities can affect population.

Deforestation and A-Forestation and importance of Forests

24. Give three importance of forest.

Ans: Importance of forest is as follow

i. Forest cause rain ii. Forest resist change in environmental temperature

ii. They provide food and shelter to animals

25. Why forests are called environment buffers? Explain **(5-times)**

Ans: Forest are called environmental buffers because it resists various changes in the environment especially temperature changes. It also cause of rain. They intercept heavy rain fall and release the water steadily and slowly to soil beneath.

26. Differentiate between Deforestation and Reforestation. **(4-times)**

Ans:

Deforestation	Reforestation
Cutting or clearance of forests is called deforestation.	Replantation of plants in a forest or plantation where a forest was existing is called reforestation.

27. What is deforestation?

Ans: Clearing or the cutting of the forest over a large area is called deforestation.

Pollution (air pollution, Green house effect, Acid Rain)

28. What is ozone Layer? Give its role. **(3-times)**

Ans: Ozone is an allotropic form of oxygen; it is made up of three oxygen atoms. Its colour is blue.

Role of ozone: Ozone acts as a shield. It prevents ultra violet rays from reaching the earth.

29. What is Ozone layer depletion? **(4-times)**

Ans: Thinning of Ozone layer due to chlorofluorocarbons is called ozone depletion. Severe ozone depletion leads to ozone hole formation, due to which UV light reaches to earth and damaging the life of organisms.

30. What is acid rain? Give four effects of acid rain. **(2-times)**
OR What is acid rain? Write its any two effects.

Ans: Rain or precipitation containing acids or acidic oxide is called acid rain. OR rain with pH below 5.4 is called acid rain. Its effects are

i. It can damage monuments, which are made up of calcium stones.
ii. It can kill aquatic animal life.
iii. It can leach nutrient from the soil leading to infertile soil.
iv. It can damage the leaf tissues of plants.

31. Write how the air conditioners are the cause of destruction of ozone layer?

Ans: Air conditioners are cause of ozone destruction because it releases chlorofluorocarbons, which are major sources of ozone depletion by reacting with ozone molecules.

$$CF_2Cl_2 \rightarrow CF_2Cl + Cl^{\cdot}$$
$$Cl^{\cdot} + O_3 \rightarrow O_2 + ClO^{\cdot}$$

32. Give two causes of green house effect **(2-times)**

Ans: i. Emission of gases from the industries.
ii. Emission of gases from the burning of fossil fuels in motor vehicles.

33. What are pollutants?

Ans: Any substance which can cause pollution is called pollutant or the substance which are harmful for the living organism and cause pollution are called pollutants.

34. Name two air pollutants and give their harmful effects.

Ans: Carbon monoxide and sulphur dioxide.
Carbon monoxide causes headache, brain damage and death.
Sulphur dioxide cause acid rain, breathing disorders and lung cancer.

(2-times)

35. Define pollution. Name its four types.

Ans: Any undesirable or unwanted change in the environment which is harmful for the living organisms is called pollution.
Types of pollution are
Water pollution, air pollution, marine pollution, and land or soil pollution, radiation pollution.

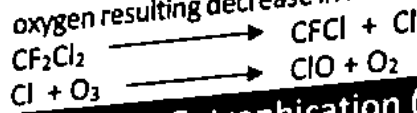
36. Give the sources and harmful effects of chlorofloro carbons (CFSs). (2-times)

Ans: Sources of CFCs are aerosol spray, foams, air conditioners and refrigerators.
Harmfull effects of CFCs are thinning of ozone layer, global warming.

37. How chlorine is responsible for ozone depletion?

Ans: Chlorine radical released from CFCs is highly reactive. It react with ozone molecules and convert ozone molecules into molecular oxygen (O_2) and atomic oxygen resulting decrease in number of ozone molecules which is called ozone depletion.

$CF_2Cl_2 \longrightarrow CFCl + Cl$

$Cl + O_3 \longrightarrow ClO + O_2$

Water pollution, Eutrophication (Algal blooms)

38. Give two causes of water pollution. (4-times)

Ans: Addition of sewerage water into water table or freshwater sources.
Industrial effluent is also source of water pollution.

(3-times)

39. What are industrial effluents? Give their role.

Ans: Industrial effluent is actually the liquid waste of industries. Effluent causes water and soil pollution. It is also dangerous for soil micro-organism and other life forms.

(3-times)

40. Define water pollution.

Ans; When the quality of water is deteriorated it is called water pollution or any undesirable change in the quality of water is called water pollution.

41. Give importance of solid wastes or production of energy from solid waste. (3-times)

Ans: Conversion of solid waste material like trash, paper, organic manure, plastic material, cans, agriculture and industrial wastes etc., by hydrogenation, pyrolysis or bioconversion can provide oil and gas.

(4-times)

42. Explain about industrial effluents.

Ans: The chemical wastes from industries are called effluent. Factories sometimes turn water ways into open sewers by dumping soil oil, chemical and other harmful liquids into them. They may kill the micro-organisms that pollute water and inhibit their growth.

43. What are industrial Effluents? Give their role. (3-times)

Ans: Industrial effluents are actually the liquid waste of industries. Effluent causes water and soil pollution. It is also dangerous for soil micro-organism and other life forms,

Inseticides & herbicides and fertilizers

44. Explain briefly how pesticides affect the human health.

Ans: Pesticides can cause cancer, other disorders like stomach, liver and kidney problems.

Health and diseases

45. Name some pathogenic and congenital disease. (2-times)

Ans: pathogenic diseases are

i. Tuberculosis (T.B), Cholera, AIDS

ii. Congenital diseases are Hemophilia, Down's syndrome. Turner syndrome.

46. Define health and disease. **(2-times)**

Ans: Normal state of homeostasis is called health while deviation from the normal homeostasis is called disease.

47. Explain ozone layer.

Ans: A layer of atmosphere extending from 10-50 kilometers above earth, which filters most of UV radiation (ultraviolet rays) and protect us from these harmful rays of the sun is known as ozone layer, as it contains ozone. In pure form ozone is bluish, explosive and highly poisonous gas. Ozone molecule is made up of three ozone molecule is made up of three oxygen atoms bounded together.

48. Give two effects of Acid Rain.

Ans: Two effects of acid rain are as follows:

1- Acid rain damages life in lakes, farms and forests.
2- Stone monuments like " Taj Mahal" are being eroded due to "Stone cancer" by acid rains.

49. Write four methods of energy conservation. **(2-times)**

Ans: Four methods to conserve energy are:

(i) Drive less, walk and use public transport more.
(ii) Minimize the use of air conditioner.
(iii) Reduce wastage by recycling.
(iv) Switch off lights and electrical appliances when they are not in use.

50. What is deforestation, and write its two harmful effects.

Ans: "Clearance of vast areas of forest for procuring lumber, planting subsistence crops or grazing cattle is called deforestation."

The destruction of forest leaves the soil barren and this is called deforestation.

Harmfull effects: If the forests are cut down at that rate, leaf canopy, which protects the soil from the beating effects, of rain will no longer exist. Consequently, some of the soil will be wasted by surface run off, reaching streams & rivers. Environmental pollution is also another harmful effect of deforestation.

51. What are the effects of ozone depletion?

Ans: As the ozone layer becomes thinner, more ultraviolet rays from the sun are able to reach earth. If more ultraviolet rays reach the earth's surface, they will affect all life on earth by increasing temperature. They cause skin cancers and cataracts in human. They can also affect crops, plants, trees and even marine plankton and distort weather patterns.

52. How energy can be produced from solid wastes?

Ans: Conversion of waste materials like trash, paper, organic manure, plastic materials, cans, agriculture and industrial waste etc - by hydrogenation, pyrolysis (destructive distillation) or bioconversion can provide oil and gas.

53. What is wild life? Give its important role.

Ans: Wild life refers to all non-cultivated plants and non-domesticated animals. Wild life plays very important role in food chain. Without these, the food chain can be disturbed to such an extent that it will be very difficult to maintain the balance.

54. Differentiate between renewable and non-renewable resources.

Ans:

Renewable resources	Non-renewable resources
➢ Air, water, food, land, forests and wildlife are renewable resources because they are never depleted. ➢ They are recycled in nature.	➢ Non-renewable resources include various metals, non-metallic minerals and fossil fuels (coal, oil and natural gas). ➢ These resources are exhaustable and once consumed cannot be recycled.

55. Write a note on forest and climate.

Ans: About half of the rain which falls in tropical forests comes from the transpiration by the trees themselves which also keep the environment cool and humid. When forests are removed, this source of rain is also removed. Cloud cover is reduced and the local climate changes quite dramatically. The temperature range from day to night is more extreme i.e, the difference between day and night temperatures increases considerably and the rainfall diminishes.

2019

56. How man is responsible to increase the number of endangered species?

Ans: Man's decisions regarding the usefulness or harmfulness of the wild life have led to serve disturbances in natural habitats. As a result many animals and plants have either become extinct or else in their number as to be on the verge of extinction. These are known as the endangered species.

57. Give reasons for world population explosion.

Ans: There are various factors affecting population growth, such as, increase in life expectancy due to better living conditions, education, better food and medicine.

58. Name any two diseases which are caused due to nutritional deficiency.

Ans: Two diseases due to nutritioinal deficiency are:

- scurvy
- beriberi
- anemia
- goiter etc.

59. Differentiate between reforestation and afforestation.

Ans:

Reforestation	Aforestation
It is necessary to replace deforestation with reforestation i.e. trees may be replanted. In clear cut areas where all of the trees have been removed, resprouting from stumps or seed germination may be protected for reforestation.	"Aforestation is establishment of new forests where no forests existed previously."

60. Differentiate between herbicides and fungicides.

Ans:

Herbicides	Fungicides
It is the type of pesticides which kills weed plants.	It is the type of pesticides which kills parasitic fungi.

61. What is Eutrophication?

Ans: This is the natural process of excessive enrichment of water with nutrients by which large amount of living organic matter grows in the water. Lakes slowly develop large concentration of aquatic plant life, which eventually decays.

62. What is population explosion, write its two causes.

Ans: Many of the problems of the world are caused by or made by an increasing human population. About 20 years ago the human population was increasing at the rate of 2% a year was doubling every 35 years, thus increasing demands for food space and other resources. There are various factors effecting population growth, such as increase in life expectancy due to better living conditions, education, better food and medicine.

63. What is algal bloom?

Ans: Human activities have speeded up this natural process of eutrophication by adding minerals and organic nutrients in larger quantities than nature would

provide, as excreta, phosphates from washing powder and nitrates and phosphates from fertilizers. Vast quantities of algae feed and reproduce on these nutrients causing the water to turn green with algal bloom.

64. Write two modifications of environment.

Ans: In past, human beings led simple lives that require little energy. As man and society progressed, the consumption of energy and materials increased. Industries have always been the largest consumers of electrical energy.

65. What is the importance of ozone layer?

Ans: A layer of atmosphere extending from 10-50 kilometers above earth, which filters most of uv radiation (ultraviolet rays) and protects us from these harmful rays of sun is known as ozone layer, as it contains ozone.

2021

66. Define reforestation. How it can be achieved in clear –cut areas.

Ans: Replantation of trees where the trees have been cut in a forest is called reforestation.

It can be achieved in clear cutting areas, where all of the trees in a large area are removed; resprouting from stump or seed germination may be protected for reforestation.

67. Define eutrophication. How man has speeded up this process?

Ans: Eutrophication is the natural process of excessive enrichment of water with nutrients by which large amount of living organic material grows in the water. Human activities have speeded this natural process eutrophication by adding minerals and organic matter in large quantities than nature would provide, as excreta, phosphates from washing powder and phosphate from fertilizers.

68. Write a note on tidal power.

Ans: Tides are mainly caused by the gravitational pull, of the moon to a lesser extent and gravitational pull of sun on the water in seas and oceans. The changing tides derive the water towards or away from land. The difference in height of water at high and low tides is made use of in a tidal power station to generate electricity. A tidal power station consists of tidal barrage. The flow of water across the barrage turns its turbine which in turn derives the generator to produce electricity.

69 .What is acid rain?

Ans: Sulphur dioxide and nitrogen dioxide emitted in the air from burning of fossil fuels, combined with water vapours in the atmosphere forming acid and these acids comes down in the form rain called acid rain.

70. How forests play their role on climate?

Ans: Forests keeps the climate cool and pleasant. Forests keep the temperature in moderate limits and cause rain. Forest acts as environmental buffers.

71. Define eutrophication. What are its effects?

Ans: Vast quantities of algae feed and reproduce on these nutrients causing the water to turn green with algal blooms. The dead algae are decomposed by aerobic bacteria, which deplete the water oxygen contents causing death of aquatic organisms. It occurs in fresh water and in sea water, both developing unpleasant colour and smell.

72. Define pollution. Write any two types of pollution.

Ans: Anything which is produced by human which is or may be harmful to human life and other living organisms is called pollution.

Air pollution Land pollution

Water pollution are the main type of pollution.

73. **What are harmful effects of lead compounds and carbon monoxide?**
Ans: **Lead compounds cause lead poisoning, brain damage and forest decline. Carbon monoxide causes headache, brain damage and death.**

74. **Give importance of forest.**
Ans: **Forests are important because of**
i. Forest keeps environment cool and pleasant.
ii. They provide shelter to animals.
iii. They provide food
iv. They provide timber and medicines
v. Prevent floods

75. **Define green house effect. Give its causes.**
Ans: Increase in earth temperature due to increases level of carbon dioxide is called green house effect.
Causes of green house effect: Over urbanization, deforestation, industrialization are the main causes of green house effect.

76. **What is green house effect and green house gases?**
Ans: Increase in earth temperature due to increases level of carbon dioxide is called green house effect. **Carbon dioxide** is the major green house gas, other than it CFCs, Nitrogen oxides, sulphur dioxide, aersoles also play role in green house effect.

LONG QUESTIONS OF CHAPTER-27 (MAN & HIS ENVIRONMENT) BOARD PAPERS-2011-21

1. Enlist various measures for energy conservation. (3-times)
2. Write a note on air pollution.
4. What are non-renewable resources? Explain with example.
5. Explain the phenomenon of green house effect. (2-times)
6. Explain flow of energy in an ecosystem.
7. Describe uses and misuses of agrochemicals. (2-times)
8. Briefly explain wildlife and fossils fuels.
9. Write a note on green house effect. (4-times)
10. What is acid rain? Give its causes and influences. (2-times)
11. Explain population explosion with its causes and on consequences.
12. Write a note on ozone layer depletion. (4-times)
13. State and explain atmospheric pollution.
14. Describe the importance of forests (3-times)
27. Explain the terms deforestation and afforestation. (2-times)
15. Write a short note on 'modification of Environments' (3-times)
17. Write a short not on "Importance of Forests" (2-times)

2016

18 Write a note on "importance of forests". (3-times)
20 What is global warming? Give the role of green house effect in global warming.
22 Write note or wild life.
23 Write note on fossil fuels.
25 Define pollution. Describe the causes and affects of water pollution.
26 Describe water and land as renewable resources.

BOARD PAPERS 2019

SAHIWAL BAORD

Biology (New Scheme) (Inter Part-II) Time : 20 Minutes
Session: (2018-2020) Objective Marks : 17

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- **A single ________ atom can react with ultraviolet rays and destroy as many as one million ozone molecules:**
(A) Oxygen (B) fluorine (C) chlorine (D) iodine

2- **Which one is the most gragile ecosystem?**
(A) grassland (B) woodland (C) tundra (D) savanna

3- **Actual location of place where an organism lives is called its:**
(A) ecosystem (B) habitat (C) niche (D) biome

4- **Archaeobacteria tolerate temperature upto:**
(A) 60°C (B) 90°C (C) 120°C (D) 150°C

5- **Antithrombin III is a biotechnological product produced in:**
(A) sheep (B) goat (C) mice (D) cow

6- **The blood serum containing antibodies is called:**
(A) lymph (B) plasma (C) antiserum (D) antigen

7- **During this phase the condensation of chromosomes reaches to its maximum:**
(A) leptotene (B) zygotene (C) pachyten (D) diskinesis

8- **Which of the following is a "start" codon?**
(A) AUG (B) UAA (C) UAG (D) UGA

9- **The particular array of chromosomes that an individual possesses is called:**
(A) kinesis (B) kinetosome (C) karyotype (D) kinetochore

10- **The cavity formed between somatic and splanchnic mesoderm is:**
(A) archanteron (B) Hensen's node (C) neurocoele (D) coelom

11- **Reproduction is very important for the survival of:**
(A) individual (B) population (C) species (D) community

12- **In honey bee male sperms are produced by:**
(A) meiosis (B) mitosis (C) apomix (D) parthenogenesis

13- **The hormones which promote bolting of some rossete is known as:**
(A) auxins (B) gibberlins (C) cytokinin (D) ethene

14- **which of the following is a bone of axial skeleton?**
(A) humerus (B) femur (C) rib (D) tibia

15- **Which of the following is plantigrade?**
(A) dog (B) horse (C) rabbit (D) monkey

16- **Excretory system of planeria is called:**
(A) protonephridium (B) metanephridium (C) malpighian tubules (D) renal tubules

17- **The category of plants that has adaptations of small and thick leaves to limit water loss is:**
(A) hydrphyte (B) xerophyte (C) mesophyte (D) hygrophyte

SAHIWAL BAORD

Biology (New Scheme) (Inter Part-II) Time : 2:40 Hours
Session: (2018-2020) Subjective Marks : 68

Note: Section I is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. Define the given terms: (i) Hypertonic environment (ii) hypotonic environment.
ii. Sketch urea cycle.
iii. Describe physiological adaptations of animals for thermoregulation.
iv. Discuss the structure and functions of collenchyma cells in plants.
v. Name the bones of pectoral and pelvic girdle.
vi. What is CRAMP?
vii. Describe various steps involved in Ex-vivo gene therapy.
viii. Discuss any two benefits of transgenic bacteria to promote health of plants.
ix. How did plants and animals adapt land habitat?
x. How will you differentiate ALPINE and BOREAL forests?
xi. Define Wild Life.
xii. Give reasons for world population explosion.

Q.3: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. What is synapse?
ii. Write two commercial applications of Ethene.
iii. What is conditioning in learning behavior?
iv. Differentiate between phenotype and genotype.
v. State the law of independent assortment.
vi. What is diabetes, name its types?
vii. Write at least two methods to get a gene of interest.
viii. Write at least two methods do get a gene of interest.
ix. What is cell suspension culture?
x. Differentiate between primary and secondary succession.
xi. Define autecology and synecology.
xii. What is commensalism? Give example.

Q.4: Write short answers to any Six parts. **(6 × 2 = 12)**

i. Write the names of four types of cytoplasm contain in the fertilized egg of ascidian.
ii. What is growth correlation?
iii. Differentiate between primary and secondary growth.
iv. What is phenyleketonuria?
v. Why mRNA is modified with cap and tail after its formation?
vi. Define cell cycle. Write its phase.
vii. Differentiate between benign and malignant tumor.
viii. What is Genetic drift?
ix. What is the concept of inheritance of acquired characteristics?

Section-II

Note: Attempt any three (3) questions: **(3 × 8 = 24)**

Q.5 (a) Give the structure and function of Nephron in human kidneys.
(b) Write a note on xerosere succession.

Q.6 (a) Explain the phenomenon of turgor movements in plants.
(b) Write down the Beadle and Tatum experiments on neurospora.

Q.7 (a) Give an account of innate behaviour.
(b) Write a note on Green House Effect.

Q.8 (a) Describe menstrual cycle in human female.
(b) Describe genetics of colour blindness.

Q.9 (a) Define teratology. Discuss various types of abnormalities in development.
(b) Define Hardy-Weinberg Theorem. Discuss the various factors affecting gene frequency.

LAHORE BAORD

Biology (New Scheme) (Inter Part-II) Time : 20 Minutes

Session: (2018-2020) Objective Marks : 17

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- **The change in frequency of alleles at a locus that occurs by chance is called:**
(A) Genepool (B) Genetic (C) Genetic drift (D) Mutation

2- **Clear cytoplasm, in an ascidian zygote produces:**
(A) Muscle cells (B) Larval epidermis (C) Gut (D) Notochord

3- **The simplest form of learning is:**
(A) Habituation (B) Imprinting (C) Insight learning (D) Latent learning

4- **The pairing of homologous chromosomes is completed in phase of meiosis:**
(A) Leptotene (B) Zygotene (C) Pachytene (D) Diplotene

5- **The particular array of chromosomes that an individual possesses is called:**
(A) Genome (B) Genepool (C) Karyotype (D) DNA-Duplex

6- **Bats and humming birds are called:**
(A) Ectoderm (B) Endotherms (C) Ecotherms (D) Heterotherms

7- **Upper layer of earth's crust is:**
(A) Dust (B) Sand (C) Land (D) Soil

8- **Corpus luteum secretes a hormone called:**
(A) Progesterone (B) Oestrogen (C) Oxytocin (D) Testosterone

9- **The enzyme luciferase is produced in an insect called:**
(A) Housefly (B) Firefly (C) Butterfly (D) Tsetsefly

10- **The malpighian tubules remove nitrogenous wastes from the:**
(A) Lymph (B) Haemolymph (C) Coelomic fluid (D) Hind gut

11- **Cell death due to tissue damage is called:**
(A) Apoptosis (B) Necrosis (C) Metastasis (D) Suicide

12- **The disease which causes immobility and fusion of vertebral joints is called:**
(A) Arthritis (B) Rickets (C) Sciatica (D) Spondylosis

13- **Primary succession, which starts in a pond ecosystem is termed as:**
(A) Derosere (B) Hydrosere (C) Ecosere (D) Xerosere

14- **Hypophosphatemic rickets is an X-linked:**
(A) Dominant trait (B) Co-dominant trait (C) Over-dominant trait (D) Recessive trait

15- **Which of the following biome is most fragile:**
(A) Tundra (B) Desert (C) Grassland (D) Forest

16- **Discharge of egg from ovary is called:**
(A) Gametogenesis (B) Oogenesis (C) Ovulation (D) Menstrual cycle

17- **The sclerenchyma cells found in seed coats and nutshells are called:**
(A) Fibers (B) Sclereides (C) Tracheids (D) Vessels

LAHORE BAORD

Biology (New Scheme) (Inter Part-II) Time : 2:40 Hours
Session: (2018-2020) Subjective Marks : 68

Note: Secotion I is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. Differentiate between osmoconfermers and osmoregulators.
ii. Define counter current multiplier.
iii. Skin does not come within the definition of excretory organ. Comments.
iv. What is jet propulsion? Explain with an example.
v. Differentiate between effective stroke and recovery stroke.
vi. What is sleep movement? Also write an example.
vii. Give any two requirements to produce recombinant DNA.
viii. Give the role of restriction endonucleases.
ix. List the name of eight cities of Pakistan where desert ecosystem occurs.
x. Differentiate between alpine and boreal coniferous forests.
xi. How man is responsible to increase the number of endangered species?
xii. Differentiate between deforestation and afforestation.

Q.3: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. How do plants respond to environmental stresses?
ii. List the four types of hormones with examples.
iii. Differentiate between CNS and PNS.
iv. Define vernalisation. Which parts of plants received its effects.
v. Differentiate between oviparous and viviparous.
vi. Explain the role of gonadotropins in human female.
vii. Write formula to calculate recombination frequency.
viii. Define codominance with an example.
ix. In grasshoppers male has 23 chromosomes, while female has 24 chromosomes. Work out.
x. Differentiate between food chain and food web.
xi. Differentiate between autecology and synecology.
xii. What roles are played by links of food chain.

Q.4: Write short answers to any Six parts. **(6 × 2 = 12)**

i. Write any four causes of aging.
ii. What are neoblasts and what is their role in development?
iii. Write any two differences between normal cells and cancer cells.
iv. How meiosis plays its role in producing genetic variations?
v. Why cap and tail is added to eukaryotic RNA, when it leaves from nucleus to cytoplasm?
vi. Write two characteristics of DNA polymerase III.
vii. Define promoter and what is its role?
viii. What is membrane invagination hypothesis?
ix. Describe briefly, how molecular biology supports evolution.

Section-II

Note: Attempt any three (3) questions: **(3 × 8 = 24)**

Q.5 (a) Describe the excretion in cockroach. Also draw labelled diagram.
(b) How the flow of energy in food chain of an ecosystem takes place?
Q.6 (a) Explain sliding filament model. How the bridges are controlled?
(b) Explain work of Beadle and Tatum on Neurospora with help of a figure.
Q.7 (a) Explain the role of hormones produced by posterior lobe of pituitary gland.
(b) Describe importance of forests.
Q.8 (a) Describe male reproductive system in man.
(b) Explain the phenomenon of sex determination in humans.
Q.9 (a) Explain Darwin theory of natural selection.
(b) Write a note on regeneration.

12

SARGODHA BOARD

Biology (New Scheme) (Inter Part-II)
Session: (2018-2020) Objective Time : 20 Minutes
Marks : 17

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- **Desert ecosystem of Bhakkar and Mianwali is:**
(A) Thar (B) Thal (C) Cholistan (D) Rohi

2- **Establishment of new forests where no forest existed previously:**
(A) Afforestation (B) Reforestation (C) Deforestation (D) Forestation

3- **Detection of change and signalling for effector's response to control system is:**
(A) Positive feed back (B) Negative feed back
(C) Feed back mechanism (D) Feed forward mechanism

4- **Aldosterone is involved in:**
(A) Transport of potassium ions into kidneys (B) Uptake of Sodium in Loop of Henle
(C) Transport of water (D) Reabsorption of water

5- **Proteins that bind to calcium in muscle contraction:**
(A) Actin (B) Myosin (C) Tropomyosin (D) Troponin

6- **Action of Venus Fly trap is:**
(A) Nyctynasty (B) Photonasty (C) Haptonasty (D) Thermonasty

7- **Testosterone is secreted by:**
(A) Sertoli cells (B) Interstitial cells (C) Germinal epithelium (D) Prostrate gland

8- **All of the following are day neutral plants EXCEPT:**
(A) Pea (B) Wheat (C) Maize (D) Cotton

9- **Contractile ring in cytokinesis is formed by:**
(A) Tubulin (B) Actin and Myosin (C) Keratin (D) Cyclins

10- **Trisomy of chromosome 18 is found in:**
(A) Down's syndrome (B) Patau syndrome (C) Edward syndrome (D) Jacob's syndrome

11- **The number of spinal nerves in man:**
(A) 24 (B) 62 (C) 12 (D) 31

12- **Pigment free area that appear at the time of fertilization in amphibians is:**
(A) Animal pole (B) Vegetal pole (C) Yolk (D) Grey crescent

13- **Each Okazaki fragment is synthesized by**
(A) RNA polymerase (B) DNA polymerase I
(C) DNA polymerase II (D) DNA polymerase III

14- **Which traits are more common in male humans:**
(A) X-linked dominant (B) X-linked recessive (C) Sex limited (D) Sex influenced

15- **Polyhydroxy butyrate is:**
(A) Antithrombin III (B) Nutra sweet
(C) Biodegradable plastic (D) Anti body from soyabean

16- **According to Endosymbiontic hypothesis, the aerobic bacteria developed into:**
(A) Ribosomes (B) Chloroplasts (C) Mitochondria (D) Golgi bodies

17- **Bacteria in the root nodules fix nitrogen and convert it into:**
(A) Nitrate (B) Nitrite (C) Amino acids (D) Ammonia

SARGODHA BOARD

Biology (New Scheme) (Inter Part-II) Time : 2:40 Hours

Session: (2018-2020) Subjective Marks : 68

Note: Secotion I is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. (8 × 2 = 16)

i. Differentiate between ureotelic and uricotelic.
ii. What is flame cell, give its function?
iii. How plants respond to cold stress?
iv. What is Hydrostatic skeleton, give example?
v. What are synovial joints?
vi. Write two adaptations in birds that help them for flight.
vii. Give at least two uses of PCR amplification and analysis.
viii. Write down the average rain fall of grassland and temperate deciduous forest.
ix. Differentiate between weather and climate.
x. What is gene pharming?
xi. Define soil, give its basic constituents.
xii. What is Eutrophication?

Q.3: Write short answers to any Eight parts. (8 × 2 = 16)

i. Define Reflex action and Reflex Arc.
ii. Defing the term synapse.
iii. What do you know about Latent learning.
iv. Sketch the life cycle of BRYOPHYTE.
v. What do you know about Apomixis?
vi. Define climacteric.
vii. Differentiate genotype from phenotype.
viii. Define and explain codominance.
ix. What do you know about mycorrhiza.
x. Differentiate population from community.
xi. Define pletiotropy. Explain it with any one example.
xii. What do you know about plant biomass of an ecosystem.

Q.4: Write short answers to any Six parts. (6 × 2 = 12)

i. What is morulla?
ii. What is hensen's node?
iii. What is Apoptosis?
iv. What are the functions of mitotic apparatus.
v. What is a theory of special creation.
vi. What is genetic drift?
vii. Differentiate between template strand and coding strand?
viii. What is inversion?
ix. Differentiate between leading and strands of DNA.

Section-II

Note: Attempt any three (3) questions: (3 × 8 = 24)

Q.5 (a) Explain the process of excretion in cockroach, with diagram.
(b) Describe the symbiotic relationships in organisms.

Q.6 (a) Describe locomotion in Paramecium.
(b) Describe the process of Transcription.

Q.7 (a) Describe the role of pancreas as an endocrine gland.
(b) Write a note on green-house effect.

Q.8 (a) Explain female reproductive system in humans.
(b) Explain the genetic basis of human blood groups.

Q.9 (a) Write a note on embryonic induction.
(b) Explain the theory of inheritance of acquired characteristics.

FAISALABAD BOARD

Biology (New Scheme) (Inter Part-II) Time : 20 Minutes
Session: (2018-2020) Objective Marks : 17

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- **The decline in thickness of ozone layer is due to increasing level of:**
(A) CO_2 (B) CFC_S (C) Hydrogen (D) Hydrocarbons

2- **Northern coniferous forests are called as:**
(A) Boreal (B) Taiga (C) Alpine (D) Deciduous

3- **Once nitrate enters the plant cell it is reduced to:**
(A) Nitrite (B) Ammonia (C) Proteins (D) Carbohydrate

4- **Biogeography, is the geographical distribution of:**
(A) Phylum (B) Class (C) Species (D) Genus

5- **Which enzyme acts as molecular scissors?**
(A) DNA polymerase (B) RNA polymerase
(C) Restriction endonuclease (D) DNA gyrase

6- **Blood serum containing antibodies is called as:**
(A) Plasma (B) Antigen (C) Immuno-globulin (D) Antiserum

7- **The particular array of chromosomes that an individual possesses is:**
(A) Kinetochore (B) Centromere (C) Karyotype (D) Kinesis

8- **In ascidian fertilized egg, yellow cytoplasm gives rise to:**
(A) Muscle cells (B) Larval epidermis
(C) Notochord & neural tube (D) Gut

9- **Structure of human brain that controls hunger is:**
(A) Amygdala (B) Hippocampus (C) Thalamus (D) Hypo-thalamus

10- **Cancer is mainly caused by mutations in:**
(A) Malignant cells (B) Somatic cells (C) Sex cells (D) Reproductive cells

11- **Synapsis takes place during:**
(A) Leptotene (B) Zygotene (C) Pachytene (D) Diplotene

12- **Release of egg from follicle is called as:**
(A) Ovulation (B) Menstruation (C) Follicle atresia (D) Fertilization

13- **The first convoluted part of vas deferens is:**
(A) Epididymis (B) Seminiferous tubule
(C) Urethra (D) Germinal epithelium

14- **Turgor pressure is generated by high osmotic pressure of cell:**
(A) Cytoplasm (B) Vacuole (C) Cell wall (D) Cell membrane

15- **The joint that allows movement in two directions only:**
(A) Cartilaginous joints (B) Fibrous joint
(C) Hinge joint (D) Ball & socket joint

16- **The incidence of uric acid kidney stones is:**
(A) 10% (B) 15% (C) 20% (D) 70%

17- **Fresh water protozoans pump out excess water by:**
(A) Food vacuole (B) Contractile vacuole (C) Pinocytosis (D) Phagocytosis

FAISALABAD BOARD

Biology (New Scheme) (Inter Part-II) Time : 2:40 Hours
Session: (2018-2020) Subjective Marks : 68

Note: Secotion I is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. (8 × 2 = 16)

i. Write at least two characters of xerophytes.
ii. What is lithotripsy? How it takes place?
iii. What are heat-shock proteins? Give their role.
iv. Define cartilage. Give its types.
v. What is osteoporosis? Why it occurs in aged women?
vi. Differentiate between passive and active flight.
vii. What is plasmid? Give an example.
viii. What is cystic fibrosis?
ix. Define climate and weather.
x. How the productivity of aquatic ecosystem is determined?
xi. Enlist at least two ways to conserve energy.
xii. Differentiate between reforestation and afforestation.

Q.3: Write short answers to any Eight parts. (8 × 2 = 16)

i. Differentiate between chemoreceptors and mechanoreceptors.
ii. Define reflex arc and give its components.
iii. Which hormones are secreted by posterior lob of pituitary gland?
iv. Define seed dormancy. Give its importance.
v. What is ovoviviparity? Give is example.
vi. Describe the process of cloning.
vii. What is a test cross? Give its significance.
viii. What are multiple alleles? Give one example.
ix. Explain testicular feminization syndrome.
x. Define succession. Name its types.
xi. Differentiate between habitat and niche.
xii. Differentiate between predation and parasitism.

Q.4: Write short answers to any Six parts. (6 × 2 = 12)

i. What is Hensen's node?
ii. What is discoidal cleavage?
iii. Differentiate between karyokinesis and cytokinesis.
iv. What changes occur in a cell during G_1-phase of interphase?
v. What are vestigial organs? Give two examples.
vi. Define genetic drift. Give its effect on a population.
vii. Name three types of RNA's. Give function of each RNA.
viii. What are Okazaki fragments?
ix. Differentiate between transcription and translation.

Section-II

Note: Attempt any three (3) questions: (3 × 8 = 24)

Q.5 (a) Define osmoregulation. Describe the various categories of plants on the basis of osmoregulation.
(b) Define an ecosystem. Write a note on biotic components of an ecosystem.

Q.6 (a) What are paratonic movements? Discuss its various types.
(b) Discuss Meselson and Stahl experiment to show semi-conservative replication.

Q.7 (a) Explain gonadotrophic hormones.
(b) What do you know about wild life? Explain it.

Q.8 (a) Describe the process of birth in human female.
(b) Describe the different patterns of sex determination.

Q.9 (a) Explain signs and process of aging.
(b) How did evolution proceed from prokaryotes to eukaryotes.
(b) Explain the evidences of evolution from embryology and molecular biology?

RAWALPINDI BOARD

Biology (New Scheme) (Inter Part-II) Time : 20 Minutes
Session: (2018-2020) Objective Marks : 17

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- **The leaves with very small surface area, are found in:**
(A) Hydrophytes (B) Mesophytes (C) Xerophytes (D) Sciophytes

2- **The compound which take part in urea cycle is:**
(A) Adenine (B) Guanine (C) Citrulline (D) Thymine

3- **Osteomalacia includes a number of disorders in which bones receive inadequate:**
(A) Water (B) Oxygen (C) Blood (D) Minerals

4- **Each A-band has s lighter stripe in its mid section called:**
(A) A-Zone (B) H-Zone (C) M-Line (D) Z-Line

5- **The receptor cells of planaria are sensitive to:**
(A) Light and pressure (B) Light, pressure and touch
(C) Touch pressure and chemicals (D) Light, pressure, touch and chemicals

6- **In nature P_{730} to P_{660} Conversion occurs in:**
(A) Dark (B) Light (C) Morning (D) Evening

7- **Lutenizing hormone in human female induces:**
(A) Menstruation (B) Menopause (C) Oogenesis (D) Ovulation

8- **The branch of biology which deals with the study of abnormal development is:**
(A) Morphology (B) Embryology (C) Teratology (D) Peratology

9- **The genetic code for glycine is:**
(A) UAG (B) GAU (C) GUA (D) GGU

10- **In turner syndrome the affected person have set of chromosomes:**
(A) XO (B) XXY (C) XYY (D) XXO

11- **The leptotene and zygotene lasts for:**
(A) few hours (B) few days (C) few weeks (D) few years

12- **The maturity on set diabetes of the young is:**
(A) An autosomal recessive trait (B) An autosomal dominant trait
(C) A sex linked trait (D) A sex influenced trait

13- **The organisms used as biofilters is:**
(A) Transgenic plant (B) Transgenic animal (C) Transgenic bacteria (D) Transgenic virus

14- **The floral parts of a flowering plant are:**
(A) Homologous (B) Analogous (C) Similar (D) Different

15- **Mutualism is a type of:**
(A) Symbiosis (B) Commensalism (C) Parasitism (D) Predation

16- **The average rainfall in temperate deciduous forest is between:**
(A) 700-2500 m.m (B) 700-800 m.m (C) 700-1000 m.m (D) 700-1500 m.m

17. **The two main causes of air pollution are industrialization and:**
(A) Automobiles (B) Urbanization (C) Deforestation (D) Overgrazing

RAWALPINDI BOARD

Biology (New Scheme) (Inter Part-II) Time : 2:40 Hours
Session: (2018-2020) Subjective Marks : 68

Note: Secotion I is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. Differentiate between pyrexia and pyrogens.
ii. What are behavioural adoptations to regulate heat exchange between animal and environment?
iii. What are excretophores? Give an example.
iv. Define turgor pressure. Give its two functions.
v. What are collenchyma cells? Discuss.
vi. Define nastic movement. What is Thermonasty?
vii. Differentiate between Menstrual cycle and Oestrous cycle.
viii. What are test tube babies? Discuss.
ix. Differentiate between climate and weather.
x. Discuss productivity of aquatic ecosystem.
xi. Differentiate between herbicides and fungicides.
xii. What is the Ozone layer depletion?

Q.3: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. Write commercial application of cytokinns.
ii. What are the functions of oxytocin hormons?
iii. Give the role of insuline and glucagon.
iv. Define linkage and give its one disadvantage.
v. What do you know about gene and locus?
vi. Define Law of segregation.
vii. Write down the treatment of cancer through gene therapy.
viii. What are bioreactors?
ix. Write two uses of PCR.
x. What are root nodules? Give their importance.
xi. Compare population and community and give their example.
xii. Define ammonification and assimilation.

Q.4: Write short answers to any Six parts. **(6 × 2 = 12)**

i. How aging can be slowed down?
ii. What are metabolic defects? Give one example.
iii. Give the role of mRNA and tRNA in translation.
iv. How do histone and DNA interact with each other in nucleosome.
v. Give two limitations of DNA polymerase III in DNA replication.
vi. How does cell death help in development of multicellular organism.
vii. What happens during diplotene stage.
viii. Define genetic drift and give its effect.
ix. Write down the measures for the preservation of endangered species.

Section-II

Note: Attempt any three (3) questions: **(3 × 8 = 24)**

Q.5 (a) Describe the structure and function of Nephron.
(b) Compare food chain with food web.

Q.6 (a) Discuss the mechanism of repair of broken bones.
(b) How did meselson and Stahl show that DNA replication is semiconservative.

Q.7 (a) Describe any four functions of Gibberellins.
(b) Define pollution. Write a note on Air or Atomospheric pollution.

Q.8 (a) Compare sexual reproduction with asexual reproduction.
(b) Describe the process of sex determination in plants and yeast.

Q.9 (a) Write a note on the development of chick upto gastrulation stage.
(b) Discuss natural selection and artificial selection.

MULTAN BOARD

Biology (New Scheme) (Inter Part-II) Time : 20 Minutes
Session: (2018-2020) Objective Marks : 17

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- The idea of endosymbiont was purposed by:
(A) Cuvier (B) Lyell (C) Malthus (D) Margulis

2- Which of the following is macronutrient?
(A) Zinc (B) iron (C) Sulphur (D) Iodine

3- Scum in eutriphication is formed by:
(A) Fungi (B) Algae (C) Bacteria (D) Cyanobacteria

4- Oxides of Nitrogen cause:
(A) Lung Cancer (B) Cough (C) Brain damage (D) Cholera

5- Bats and humming birds are example of:
(A) Ectotherms (B) Endotherms (C) Heterotherms (D) Poikilotherms

6- Trimethylamine oxide is produced in fishes which are:
(A) Cartilaginous (B) Bony (C) Fresh water (D) Marine water

7- The inflammatory degenerative disease of joint is:
(A) Arthritis (B) Sciatica (C) Herniation (D) Spondylosis

8- The cells found in seed coats and nut shells are:
(A) Fibers (B) Sclereides (C) Vessels (D) Trachea

9- Pavlov performed experiments on dog to prove:
(A) Conditional reflex I (B) Habituation (C) Conditional reflex II (D) Imprinting

10- Photoperiodism was first studied by Garner and Allard in:
(A) 1918 (B) 1920 (C) 1922 (D) 1924

11- The increase of level of estrogen stimulates secretion of:
(A) ACTH (B) FSH (C) Progesterone (D) LH

12- Gray equatorial cytoplasm gives rise to:
(A) Neural tube (B) Gut (C) Muscle cells (D) Larval epidermis

13- Genetic code for the amino acid methionine is:
(A) AUC (B) UGC (C) CGC (D) AUG

14- The chromatin material gets condensed by folding and chromosomes appear as thin thread in mitosis at the beginning of:
(A) Interphase (B) Prophase (C) Metaphase (D) Anaphase

15- The chromatids repel each other during:
(A) Zygotene (B) Pachytene (C) Diplotene (D) Diakinesis

16- The type of inheritance with same phenotypic and genotypic ratio, in F2:
(A) Dominance (B) Incomplete dominance
(C) Epistasis (D) Co-dominance

17- An antibody made by soybeans can be used for treatment of:
(A) AIDS (B) Hepatitis (C) Herpes simplex (D) Genital herpes

MULTAN BOARD

Biology (New Scheme) (Inter Part-II) Time : 2:40 Hours
Session: (2018-2020) Subjective Marks : 68

Note: Secotion I is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. (8 × 2 = 16)

i. Write two adaptations of hydrophytes.
ii. What are heat shock proteins?
iii. Why temperature of the body increases during fever?
iv. How muscle fatigue is produced?
v. Differentiate between tendons and ligaments.
vi. What is hemiation of disc?
vii. Write two primary goals of human genome project.
viii. What is Probe? Give its use.
ix. Differentiate between weather and climate.
x. Define productivity of an ecosystem.
xi. Write two effects of acid rain.
xii. Define soil and write its constituents.

Q.3: Write short answers to any Eight parts. (8 × 2 = 16)

i. Write down two commercial applications of Gibberellins.
ii. Write down two major functions of mid brain.
iii. What are the abnormalities caused by the destruction of the adrenal cortex?
iv. Write down few words on Genital Herpes.
v. Write down the name of interstitial hormone. What are its functions?
vi. Define Parthenocarpy. Write down the names of two fruits in which it occurs.
vii. Define Jumping Genes.
viii. Differentiate qualitative traits from quantitative traits.
ix. What are compound sex chromosomes? Give an example.
x. What is Biome? Write down the names of two terrestrial biomes.
xi. Define autecology and synecology.
xii. What are root modules? Give an example.

Q.4: Write short answers to any Six parts. (6 × 2 = 12)

i. What is the difference between inhibitory effect and compensatory effect?
ii. Differentiate between growth and development.
iii. What is metastasis?
iv. What happens during metaphase I?
v. Give two measures to protect the endangered species.
vi. Define homologous organs with an example.
vii. Define central dogma.
viii. What are Okazaki fragments?
ix. Define karyotype.

Section-II

Note: Attempt any three (3) questions: (3 × 8 = 24)

Q.5 (a) Give an account of Excretion in Planaria.
(b) Write a note on Grazing.
Q.6 (a) Define paratonic movements in plants. Describe Nastic movements in detail.
(b) How did Meselson and Stahl show that DNA replication is semi-conservative?
Q.7 (a) Discuss hormones of anterior lobe of pituitary gland.
(b) Explain the terms deforestation and afforestation.
Q.8 (a) Write a note on Birth.
(b) Define and explain incomplete dominance in plants.
Q.9 (a) Write comprehensive note on growth correlations.
(b) State and explain the Hardy-Weinberg theorem.

BAHAWALPUR BOARD

Biology (New Scheme) (Inter Part-II) Time : 20 Minutes
Session: (2018-2020) Objective Marks : 17

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- **How much water is needed to excrete 1 g of Ammonia Nitrogen:**
(A) 400 ml (B) 500 ml (C) 600 ml (D) 700 ml

2- **The active uptake of Sodium in the loop of Henle is provided by the action of Hormone:**
(A) Cortisone (B) Testosterone (C) Aldosterone (D) Progesterone

3- **Movements shwon by sperms of liver-worts, ferns towards archegonia is a:**
(A) Chemotactic (B) Phototactic (C) Chemotrophic (D) Phototrophic

4- **An increase in the plant girth due to the activity of Vasular Cambium is called:**
(A) Primary Growth (B) Secondary Growth (C) Sap Wood (D) Heart Wood

5- **Nociceptors produce the sensation of:**
(A) Pain (B) Light (C) Taste (D) Hearing

6- **Developing Seeds are rich source of:**
(A) Auxins (B) Cytokinins (C) Gibberellins (D) All these

7- **Example of Day Neutral Plant is:**
(A) Tomato (B) Soyabean (C) Xanthium (D) Chrysanthium

8- **Somites are formed and organized by:**
(A) Ectoderm (B) Mesoderm (C) Endoderm (D) Blastoderm

9- **A Gene with initiation codon, which encodes the Amino Acid methionine is:**
(A) UAA (B) UAG (C) AUG (D) UGG

10- **The spread of Tumor Cells and establishment of secondary areas of growth is known as:**
(A) Epigenesis (B) Metastasis (C) Apoptosis (D) Necrosis

11- **Pairing of Chromosomes is called as:**
(A) Synapse (B) Synapsis (C) Bivalent (D) Tetrad

12- **Hypophosphatemic rickets is an __________ trait.**
(A) X-linked (B) Y-linked (C) X and Y linked (D) An Autosomal

13- **DNA Polymerase Enzyme was isolated from:**
(A) Viruses (B) Bacteria (C) Fungi (D) Protozoa

14- **Endosymbiont Hypothesis was proposed by:**
(A) Wallace (B) Lamarck (C) Lynn Margulis (D) Linnaeus

15- **The bacteria in the root nodules fix nitrogen in soil from air, converting it into __________:**
(A) Nitrate (B) Nitrite (C) Ammonia (D) Amino Acid

16- **Limnetic Phytoplankton includes the:**
(A) Bacteria (B) Algae (C) Cyanobacteria (D) Mosses

17- **Which one of the following is responsible for headache, brain damage and death:**
(A) Oxides of Nitrogen (B) Lead Compounds
(C) CFCS (D) Carbon Monoxide

BAHAWALPUR BOARD

Biology (New Scheme) (Inter Part-II) Time : 2:40 Hours
Session: (2018-2020) Subjective Marks : 68

Note: Secotion I is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. What are Juxtamedullary Nephrons? Give their function.
ii. What is Pyrexia?
iii. Define Anhydrobiosis.
iv. What is Rigor Mortis?
v. Differentiate between Photactic and Phototropism Movements.
vi. What is Cleft Palate?
vii. Differentiate between Ex-vivo and in –vivo Gene Therapy.
viii. Write possible ways to get the Gene of Interest.
ix. Write down Soil Conditions of Grassland Ecosystem.
x. What is meant by Productivity of an Ecosystem?
xi. Why Forests are called Environmental Buffers?
xii. What is Ozone Layer?

Q.3: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. What is Feed Back Mechanism? Give an example.
ii. Differentiate between Kineses and Taxes.
iii. How Pancreas acts as both Exocrine and Endocrine Gland?
iv. Draw Graphic representation of Life Cycle of Bryophytes.
v. Explain Gonorrhea.
vi. How a Seed is formed?
vii. Explain the term MODY.
viii. What is Over Dominance? Give an example.
ix. An Rh^- Woman is married to an Rh^+ man whose father was also Rh^-. What is the probable risk of Erythroblastosis Foetalis in their babies?
x. Differentiate between Primary and Secondary Succession.
xi. What is Biome? Name any four major terrestrial biomes.
xii. Explain Mycorrhiza with an example.

Q.4: Write short answers to any Six parts. **(6 × 2 = 12)**

i. Define Growth Correlation.
ii. Differentiate Epiblast from Hypoblast.
iii. How many Chromosomes are found in Pencillium and Mosquito?
iv. Define Dispersive Replication of DNA.
v. What do you know about the term Transcription?
vi. Define the term non-disjunction of Chromosomes.
vii. What are Events happen in Diakinesis?
viii. Differentiate Natural Selection from Special Creation.
ix. Define Endangered Species. Write down the names of two species from Pakistan.

Section-II

Note: Attempt any three (3) questions: **(3 × 8 = 24)**

Q.5 (a) Describe adaptations in Plants to low and high temperature.
(b) Describe Predation Parasitism and their significance.

Q.6 (a) Discuss different types of Joints.
(b) Describe the process of Transcription in detail.

Q.7 (a) Define Feedback Mechanism. Explain with an example.
(b) Define Pollution. Discuss its various types.

Q.8 (a) Describe Male Reproductive System in Human.
(b) Discuss the genetics of ABO Blood Group System.

Q.9 (a) Write a note on Neurulation in Chick Embryo.
(b Discuss "Migration" and Genetic drift as factors affecting Gene Frequency.

GUJRANWALA BOARD

Biology (New Scheme) (Inter Part-II) Time : 20 Minutes
Session: (2018-2020) Objective Marks : 17

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- Ozone depletion is commonly caused by:
(A) CFCs (B) CO_2 (C) smoke (D) smog

2- A gamete without any sex chromosome is called:
(A) heterogamete (B) nullo gamete (C) nill gamete (D) homogamete

3- Coniferous forests located at high altitude are called:
(A) boreal (B) tundra (C) alpine (D) savanna

4- The paired chromosomes repel each other and begin to separate in subphase of meiosis-I is:
(A) zygotene (B) diakinesis (C) diplotene (D) pachytene

5- Disease in living organisms caused by parasites is called:
(A) parasitism (B) infestration (C) infection (D) predation

6- Separation of homologous chromosomes occurs during:
(A) prophase (B) metaphase (C) anaphase (D) telophase

7- Which one is not a vestigial organ of human being?
(A) appendix (B) coccyx (C) nictitating membrane (D) eye lid

8- Which one is not a part of limbic system?
(A) thalamus (B) hypothalamus (C) amygdala (D) hippocampus

9- Transgenic bacteria are produced in large vats called:
(A) transducer (B) bioreactor (C) biomultiplier (D) culter media

10- Tetany is a disease caused by:
(A) low calcium in blood (B) low vit. D in blood
(C) low sugar in blood (D) high calcium in blood

11- The phenomena in which transfer of genetic material from one cell to another and can alter the genetic make up of the recipient cell is:
(A) translocation (B) translation (C) transduction (D) transformation

12- The inactive non conducing wood is called:
(A) primary wood (B) secondary wood (C) heart wood (D) sap wood

13- The negative physiological changes in our body are called:
(A) degeneration (B) abnormalities (C) aging (D) regeneration

14- Each cardiac beat supplies __________ of blood to human kidney:
(A) 10 % (B) 15 % (C) 20 % (D) 25 %

15- During pregnancy, luterotropic hormone LTH and placental lactogen stimulate Mammary development in preparation for:
(A) gestation (B) lactation (C) after birth (D) miscarriage

16- Detection of changes and signalling for effector's response to control system is called:
(A) -ive feedback mechanism (B) feedback mechanism
(C) transformation (D) nephridial system

17- Some times partheno carpy is artificially induced for commercial purpose as in tomato, peppers by adding:
(A) gibberellins (B) cytokinins (C) auxins (D) ethene

GUJRANWALA BOARD

Biology (New Scheme) (Inter Part-II) Time : 2:40 Hours
Session: (2018-2020) Subjective Marks : 68

Note: Secotion I is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. (8 × 2 = 16)

i. Compare Hypotonic environment with hypertonic environment.
ii. What are "Malpighian Tubules"? In which organism they are found?
iii. Enlist the three steps in urine formation in human.
iv. Define secondary growth. Give its significance.
v. Name the types of turgor movements.
vi. What is cramp? Give its two causes.
vii. What are the two goals of the human genome project?
viii. What are probes? Give its use.
ix. What are planktons? Give its two types.
x. Differentiate between coniferous alpine and coniferous boreal forest.
xi. Name any two diseases which are caused due to nutritional deficiency.
xii. Define pollution. Give its four types.

Q.3: Write short answers to any Eight parts. (8 × 2 = 16)

i. What is the main function of parathyroid gland?
ii. Write down commercial applications of Ethene.
iii. Define the term effectors. Write down names of two important effectors of humans.
iv. Define diplohaplontic life in plants.
v. How you define oviparous and viviparous?
vi. Define test tube babies.
vii. What do you know about monohybrid and dihybrid crosses?
viii. What do you know about "Epistasis"?
ix. What are "Polygenic Traits"? Give an example from human beings.
x. How xerosere differentiate from hydrosere?
xi. What is "Prey and Predator"?
xii. Define the term "Plant Biomass"?

Q.4: Write short answers to any Six parts. (6 × 2 = 12)

i. Differentiate between point mutation and chromosomal aberrations.
ii. What is the role of RNA polymerase in Transcription?
iii. Briefly describe Alkaptonuria disease.
iv. Differentiate between inhibitory and compensatory effect.
v. What is "Discoidal Cleavage"?
vi. What changes occur in cell during metaphase of mitosis?
vii. What is non-disjunction of chromosomes?
viii. Define homologous organs, give one example.
ix. Briefly describe, how biogeography provides an evidence for evolution?

Section-II

Note: Attempt any three (3) questions: (3 × 8 = 24)

Q.5 (a) Explain the process of excretion in Earthworm with labelled diagram.
(b) Describe two major forms of succession.

Q.6 (a) Define Antagonism. Discuss the case of Elbow joint with their phenomenon.
(b) Write a note on Watson and Crick model of DNA.

Q.7 (a) What are receptors, discuss their types.
(b) Discuss "Greenhouse Effect" and "Acid Rain".

Q.8 (a) Describe human female's menstrual cycle.
(b) Define epistasis and explain it with Bomby phenotype.

Q.9 (a) What is "Regeneration"? Discuss it in various animals.
(b) Describe the main points of theory of natural selection.

D.G KHAN BOARD

Biology (New Scheme) (Inter Part-II) Time : 20 Minutes
Session: (2018-2020) Objective Marks : 17

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- **Most cartilaginous fishes possess salt excreting organs known as the:**
(A) Caecal gland (B) Foetal gland (C) Rectal gland (D) Sebaceous gland

2- **In human beings, the homeostatic thermostat is present in a:**
(A) Amygdala (B) Hippocampus (C) Thalamus (D) Hypothalamus

3- **The collenchymatous cells are highly lignified and found in the:**
(A) Epidermis (B) Cortex (C) Pith (D) Xylem

4- **Tube feet are locomotory organs of:**
(A) Jelly fish (B) Silver fish (C) Cuttle fish (D) Star fish

5- **Flowering is induced in pineapple by growth hormone called:**
(A) Gibberellins (B) Abscisic acid (C) Cytokinins (D) Ethene

6- **Low temperature treatment given to plants stimulates the production of vernalin which is actually the:**
(A) Auxin (B) Gibberellins (C) Cytokinins (D) Ethene

7- **Most of the major organs of embryo are formed within the:**
(A) 10 week (B) 12 week (C) 14 week (D) 16 week

8- **Gray vegetal cytoplasm gives rise to:**
(A) Larval epidermis (B) Muscle cell (C) Gut (D) Neural tube

9- **Sickle cell anemia is caused due to change of glutamic acid to:**
(A) Histidine (B) Lucine (C) Valine (D) Prolin

10- **The spindle fibers are composed of traces of RNA and a protein called:**
(A) Insulin (B) Actin (C) Myosin (D) Tubulin

11- **Separation of homologous chromosomes occur during:**
(A) Prophase (B) Metaphase (C) Anaphase (D) Telophase

12- **If an offspring has its parental types 30+30 and recombinant types 20+20. What is the percentage of its recombination frequency.**
(A) 20 (B) 40 (C) 60 (D) 80

13- **A team of Japanese scientists are attempted to introduce the C4 Cycle into the**
(A) Wheat (B) Rice (C) Corn (D) Cotton

14- **Flagella may have arisen through ingestion of Prokaryotes like:**
(A) Closteridium (B) Vibro (C) Spirochetes (D) Salmonella

15- **Relationship between insects and flowering plants is the example of:**
(A) Commensalism (B) Mutualism (C) Predation (D) Parasitism

16- **Andropogon, Stipa and Panicum are found in ecosystem called.**
(A) Grass land (B) Desert (C) Tundra (D) Coniferous

17- **The percentage of land under cultivation is:**
(A) 30 % (B) 21 % (C) 11 % (D) 5 %

D.G KHAN BOARD

Biology (New Scheme) (Inter Part-II) Time : 2:40 Hours
Session: (2018-2020) Subjective Marks : 68

Note: Secotion I is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. (8 × 2 = 16)

i. Write two adaptations of xerophytes.
ii. Make sketch of urea cycle.
iii. Briefly describe hemodialysis.
iv. What is sciatica and its causes.
v. Differentiate between active and passive flight.
vi. What are synovial joints? Write the names of its two types.
vii. Write two practical uses of DNA finger printing technology.
viii. What are restriction endonucleases?
ix. What is limnetic zone, mention its life.
x. Write about two factors which influence life on land.
xi. What is population explosion, write its two causes.
xii. What is algal bloom?

Q.3: Write short answers to any Eight parts. (8 × 2 = 16)

i. Write down the functions of sympathetic nervous system.
ii. What are two similarities of nervous coordination and chemical coordination?
iii. Define diurnal rhythms and circannual rhythms.
iv. Define asexual and sexual reproduction.
v. What do you know about apomixis?
vi. Write down the function of ACTH released from fetal pituitary.
vii. Define test cross.
viii. What is a genic system for determination of sex?
ix. Define Pleitotropy with an example.
x. Define biogeochemical cycle.
xi. How Niche is different from habitat?
xii. Define food chain, draw an example of simple food chain.

Q.4: Write short answers to any Six parts. (6 × 2 = 12)

i. Define aging. Give four signs of aging.
ii. Compare determinate with indeterminate growth.
iii. Differentiate between malignant and benign tumor.
iv. What is the cause and symptoms of Down's syndromes.
v. Name any four animal species declared extinct in Pakistan.
vi. How molecular biology provides an evidence for evolution?
vii. Write down the structural formulae of cytosine and thyamine.
viii. What is alkaptonuria? Give its cause.
ix. Differentiate between template and coding strand.

Section-II

Note: Attempt any three (3) questions: (3 × 8 = 24)

Q.5 (a) Explain different stages of xerosere succession.
(b) Describe excretion in plants.

Q.6 (a) Describe the mechanism of repair of broken bone.
(b) How Alfred Hershey and Martha Chase proved that DNA is hereditary material?

Q.7 (a) Differentiate between nervous system of Hydra and Planaria.
(b) Write a note on degradation and depletion of energy resources.

Q.8 (a) Sketch the life cycle of an Angiosperm.
(b) Define sex linkage. Discuss X-linked dominant inheritance in humans.

Q.9 (a) Define Meristem, describe its various types.
(b) Write a note on endangered species.

Answers (Sahiwal Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
C	C	B	C	B	C	C	A	C	D	C	B	B	C	D	A	B

Answers (Lahore Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
C	B	A	C	C	D	D	A	B	B	D	D	B	A	A	C	B

Answers (Sargodha Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
B	A	C	B	D	C	B	B	A	C	B	D	D	B	C	C	D

Answers (Faisalabad Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
B	B	B	C	C	D	C	A	B	B	B	A	A	B	C	A	B

Answers (Rawalpindi Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
C	C	D	B	B	A	D	C	D	A	A	B	C	A	A	D	B

Answers (Multan Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
D	C	B	B	C	A	A	B	A	B	D	A	D	B	C	A	D

Answers (Bahawalpur Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
B	C	A	B	A	D	A	B	C	B	B	A	B	C	C	C	D

Answers (Gujranwala Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A	B	C	C	B	C	D	A	B	A	D	C	C	C	B	B	C

Answers (D.G. Khan Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
C	D	D	D	D	B	B	C	C	D	C	B	B	C	B	A	C

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BOARD PAPERS 2021

SAHIWAL BOARD

Biology (New Scheme) (Inter Part-II) Time : 20 Minutes
Session: (2021) Objective Marks : 17

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- The plants which *have* the adaptations for reduced rate of transpiration.
(A) Hydrophytes (B) Mesophytes (C) Xerophytes (D) Bryophytes

2- The amount of water needed to excrete 1g of Ammonia nitrogen.
(A) 500 ml (B) 1000 ml (C) 1500 ml (D) 2000 ml

3- Which one of the given is paired bone in cranium?
(A) Frontal (B) Occipital (C) Sphenoid (D) Temporal

4- The acid which is a cause of muscle fatigue.
(A) Lactic acid (B) Sulphuric acid (C) Nitric acid (D) Hydrochloric acid

5- A selective weed killer is:
(A) NAA (B) 2,4 D (C) Ethene (D) Abscic acid

6- In honey bee the males are:
(A) Haploid (B) Diploid (C) Triploid (D) Polyploid

7- The formation of rounded closely packed mass of blastomeres is called:
(A) Cleavage (B) Morulla (C) Blastula (D) Gastrula

8- In fertilized egg of an ascidian Yellow cytoplasm gives rise to:
(A) Epidermis (B) Gut (C) Notochord (D) Muscle cells

9- In E.Coli the true replicating enzyme is:
(A) DNA polymerase-I (B) DNA polymerase-II
(C) DNA polymerase-III (D) DNA polymerase-IV

10- The full cell cycle takes 90 minutes in:
(A) Human (B) Yeast (C) Bacteria (D) Angiosperms

11- Crossing over occurs in:
(A) Leptotene (B) Zygotene (C) Pachytene (D) Diplotene

12- Keeping in view the Pod colour in Pea plant, the dominant colour is:
(A) Green (B) Yellow (C) White (D) Red

13- A genome is a full set of genes of:
(A) Community (B) Population (C) Individual (D) Biosphere

14- The prokaryotes may have arisen more than billion years ago.
(A) 3.5 (B) 4.5 (C) 5.5 (D) 6.5

15- The role a species plays in a community including behavior and influence is:
(A) Habitat (B) Biome (C) Niche (D) Population

16- Cactus is found in the ecosystem:
(A) Forest (B) Desert (C) Grass land (D) Tundra

17- A good example of environmental buffer is:
(A) Lake (B) River (C) Forest (D) Desert

SAHIWAL BOARD

Biology (New Scheme) **(Inter Part-II)** **Time: 2:40 Hours**

Session: (2021) **Subjective** **Marks: 68**

Note: Secotion I is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. Write two differences between cortical nephron and juxtamedullary nephron.
ii. Differentiate between ectotherms and endotherms.
iii. Define Panting and Pyrogens.
iv. Define Sclerenchyma. Write the types of Sclerenchyma cells.
v. Write four major functions of skeletal system.
vi. Define Cartilage. What are two types of cartilage?
vii. What is the significance of evolution of pollen tube in spermatophytes?
viii. Define Seed Dormancy. What is its significance for plants?
ix. Define Grassland Ecosystem. Where grasslands are found in Pakistan?
x. Write about animal life found in near-shore zone of a fresh water lake.
xi. Write the effects of acid rain.
xii. Define reforestation. How it can be achieved in clear-cut areas?

Q.3: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. Define Reflex Action and Reflex Arc.
ii. Draw labelled sketch of motor neuron.
iii. What is Epilepsy? Name the test for proper diagnosis.
iv. Differentiate between linkage and crossing over.
v. What are sex linked recessive traits? Why men are mom vulnerable than women?
vi. What is Erythroblastosis foetalis? How it is treated after birth?
vii. Give three main steps of dideoxy method of gene sequencing.
viii. What are plasmids? How they were discovered?
ix. What is Hypeecholesterolemia? How it is treated now a days?
x. Define Ecosystem. Enlist its biotic and abiotic components.
xi. What is assimilation in Nitrogen-cycle and how it is in contrast to nitrification?
xii. Give two definitions of "Niche".

Q.4: Write short answers to any Six parts. **(6 × 2 = 12)**

i. What are meristems? Give two examples.
ii. Differentiate between maturation and differentiation.
iii. Define Transformation.
iv. Enlist types of chromosomes.
v. Differentiate between chromosomes and nucleosomes.
vi. Define Mitosis.
vii. Differentiate between Cytokinesis and Karyokincsis.
viii. What is biogeography?
ix. Differentiate between homologous organs and analogous organs.

Section-II

Note: Attempt any three (3) questions: **(3 × 8 = 24)**

Q.5(a) Describe thermoregulatory strategies in mammals including human in cold temperature.
(b) Write a note on Biosphere in detail.
Q.6 (a) What are skeletal muscles? Discuss their structure in detail.
(b) Write a note on chemical nature of DNA.
Q.7 (a) What are hormones? How are they classified?
(b) Write a note on ozone depletion and greenhouse effect.
Q.8 (a) Describe male reproductive system of man. (Diagram not needed)
(b) Explain with example Mendel's law of segregation.
Q.9 (a) What is Regeneration? Explain it with the help of examples in different groups of animals.
(b) Write a short note on Neo-Darwinism.

BAHAWALPUR BOARD

Biology (New Scheme) (Inter Part-II) Time : 20 Minutes
Session: (2021) Objective Marks : 17

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- Non-Surgical removal of Kidney Stone is called:
(A) Dialysis (B) Uremia (C) Lithotripsy (D) Kidney Transplant

2- In Pelvic Region Fusion of four Posterior Vertebrae forms
(A) Coccyx (B) Sacrum (C) Pubis (D) Ischium

3- Turgor Pressure is generated by high osmotic pressure of the cell
(A) Cytoplasm (B) Protoplasm (C) Vacuole (D) Nucleus

4- The active absorption of Sodium in the ascending limb of Henle is promoted by:
(A) ADH (B) ATCH (C) Vesopression (D) Aldosterone

5- Leaf Abscission is promoted by:
(A) Auxins (B) Gibberellins (C) Cytokinins (D) Abscisic Acid

6- The Hormone which releases the lateral buds from apical dominance is:
(A) Auxins (B) Gibberellins (C) Cytokinins (D) Abscisic Acid

7- Cleavage in fertilized egg results in the formation of
(A) Gastrula (B) Blastula (C) Morulla (D) Neurula

8- Estrogen produced by Ovary inhibits the secretion of
(A) FSH (B) LH (C) ADH (D) ATCH

9- All are Stop Codons except
(A) UAA (B) AUG (C) UAG (D) UGA

10- Maternal Foetal Incompatibility can result due to marriage between
(A) Rh^+ male and Rh^- female (B) Rh male and Rh^+ female
(C) Rh^+ male and Rh^+ female (D) Rh^- male and Rh^- female

11- The syndrome in which male has enlarged breasts, obesity and small testes with no sperms is:
(A) Down's Syndrome (B) Turner's Syndrome
(C) Klinefelter's Syndrome (D) Jacob's Syndrome

12- During Prophase I of Meiosis, Tetrads are formed in
(A) Leptotene (B) Zygotene (C) Pachytene (D) Diplotene

13- Bacterial Cells take up recombinant plasmid if they are treated with:
(A) Calcium Chloride (B) Sodium Chloride
(C) Ammonium Chloride (D) Barium Chloride

14- The Ecosystem in which Soil is Grayish brown, very fertile and rich in organic matter is:
(A) Coniferous Forest (B) Grassland
(C) Temperate Deciduous Forest (D) Tundra

15- Relationship between Shark and Remora attached to it is an example of
(A) Symbiosis (B) Mutualism (C) Parasitism (D) Commensalism

16- According to Endosymbiont Hypothesis, ingestion of Prokaryotes similar to Cyanobacteria could have developed into:
(A) Mitochondria (B) Chloroplasts (C) Nucleus (D) Dictyosomes

17- All are causes of Green House effect except:
(A) Deforestation (B) Industrialization
(C) Over Urbanization (D) Reforestation

BAHAWALPUR BOARD

Biology (New Scheme) (Inter Part-II) Time: 2:40 Hours
Session: (2021) Subjective Marks: 68

Note: Secotion I is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. (8 × 2 = 16)

i. What is Lithotripsy? Give the Mechanism.
ii. What are Poikilotherms? Give one example as well.
iii. Define Homeostasis. Give components of Homeostatic Control System.
iv. Differentiate between Tendons and Ligaments.
v. Briefly describe the Hematoma Formation.
vi. Give the composition of Thin Filaments in Skeletal Muscles.
vii. Site the route of sperms from Testis to Outside in man.
viii. Define Menopause and Ovulation.
ix. Differentiate between Prairies and Savanna.
x. What is Taiga? What conditions do animals face residing there?
xi. Give the effects of Ozone Layer Depletion.
xii. Define Eutrophication. How man has speeded up this process?

Q.3: Write short answers to any Eight parts. (8 × 2 = 16)

i. Describe Feedback Mechanism with an example.
ii. Define Parasympathetic Nervous System.
iii. Write a note on Parathyroid Glands.
iv. What is Complete Dominance?
v. Define Over Dominance.
vi. Differentiate between Homozygous and Homozygote.
vii. Write a note on Recombinant DNA Technology.
viii. How can we get a Gene of Interest?
ix. How Plant Health can be promoted by Transgenic Bacteria?
x. What is a Niche?
xi. Define Food Web.
xii. Define Lichens in detail.

Q.4: Write short answers to any Six parts. (6 × 2 = 12)

i. What are intercalary Meristems?
ii. What is Discoidal Cleavage?
iii. Define Point Mutation.
iv. Compare Euchromatin with Heterochromatin.
v. What are Okazaki Fragments?
vi. What is Metastasis?
vii. What changes occur in Cell during anaphase of Mitosis?
viii. Define the term Homology. Give example.
ix. What is the role of Migration in affecting Gene Frequency?

Section-II

Note: Attempt any three (3) questions: (3 × 8 = 24)

Q.5(a) Discuss Counter-Current Multiplier with reference to concentration of excretory products.
(b) Write a note on the Nitrogen Cycle.

Q.6 (a) Describe the types of Joints on the basis of Structure.
(b) How Cells use RNA to make Proteins?

Q.7 (a) What is Synapse? Diagrammatically mention how nerve impulse passes through a synapse?
(b) Describe importance of Forests for human life.

Q.8 (a) Describe the Female Reproductive Cycle in Humans.
(b) Define and explain Incomplete Dominance with example.

Q.9 (a) Describe Growth Correlation in detail.
(b) Discuss Theory of Natural Selection and Adaptation.

RAWALPINDI BOARD

Biology (New Scheme) **(Inter Part-II)** **Time : 20 Minutes**
Session: (2021) **Objective** **Marks : 17**

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- The active up take of sodium in ascending limb of loop of Henle is promoted by _____ hormone:
(A) Aldosterone (B) ADH (C) Testosterone (D) Progesterone

2- Which one of the following is an ectotherm:
(A) Bird (B) Huming bird (C) Amphibian (D) Bat

3- The active conducting portion of wood in older trees is:
(A) Sap wood (B) Heart wood (C) Bark (D) Callus

4- Arthritis is an inflammatory or degenerative disease that damage:
(A) Muscles (B) Brain (C) Joints (D) Kidney

5- The part of brain, which play role in the formation of long term memory is:
(A) Thalamus (B) Hippocampus (C) Amygdala (D) Pons

6- Fruit development without fertilization is called:
(A) Vernalization (B) Parthenogenesis (C) Parthenocarpy (D) Dormancy

7- Which colour cytoplasm of an ascidian fertilized egg gives rise gut_____:
(A) Clear cytoplasm (B) Yellow cytoplasm
(C) Grey equatorial cytoplasm (D) Grey vegetal cytoplasm

8- The ability to regain the lost or injured part of the body is called:
(A) Aging (B) Regeneration (C) Generation (D) Degeneration

9- Which of the following is initiation codon?
(A) AUG (B) UAA (C) UGG (D) UGA

10- The division of nucleus during cell division is called:
(A) Cytokinesis (B) Karyokinesis (C) Parthenogenesis (D) Karyotype

11- The crossing over occur in _____stage:
(A) Leptotene (B) Zygotene (C) Pachytene (D) Diplotene

12- A gamete without any sex chromosome is:
(A) Heterogamete (B) Homogamete (C) Nullogamete (D) Isogamete

13- The plasmid PSC_{101}, has antibiotic resistance gene for:
(A) Tetracycline (B) Ampicillin (C) Penicillin (D) Terramycin

14- Archaeobacteria can tolerate temperature upto:
(A) 118°C (B) 119°C (C) 120°C (D) 121°C

15- The organism, which inhibit the root nodules of legume plants are:
(A) Fungi (B) Algae (C) Bacteria (D) Cynobacteria

16- The grass land in tropical climate having woody trees are called:
(A) Prairies (B) Savanna (C) Tundra (D) Alpine

17- Establishment of new forests where no forest existed is known as:
(A) Afforestation (B) Reforestation (C) Foréstation (D) Deforestation

RAWALPINDI BOARD

Biology (New Scheme) | (Inter Part-II) | Time: 2:40 Hours
Session: (2021) | Subjective | Marks: 68

Note: Secotion I is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. What is peritoneal dialysis?
ii. What is panting?
iii. Differentiate between Poikilotherms and Homeotherms.
iv. What is Ecdysis?
v. Differentiate between Hyaline cartilage and Elastic Cartilage.
vi. What is Sciatica?
vii. What is diploid parthenogenesis?
viii. What are fraternal twins?
ix. Write the plants in temperate deciduous forests.
x. Write a note on profindal zone.
xi. Write a note on Tidal power.
xii. What is reforestation?

Q.3: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. Define gene linkage. How does gene linkage affect variations among offspring's?
ii. How are transgenic bacteria used to improve plant health? Give two examples
iii. What are different types of hormones on the basis of chemical nature?
iv. Define food web. How do pathways of food web help to maintain stability of ecosystem?
v. Enlist antibodies found in A,AB,B and 0 blood groups.
vi. How plant growth is affected by ethene?
vii. Differentiate between Phenotype and genotype with examples.
viii. Write the structural components of limbic system.
ix. Define DNA finger printing. Write its significance
x. Define habitat and niche.
xi. What is the significance of Transgenic Corn and Soybean?
xii. Define mutualism. Give two examples.

Q.4: Write short answers to any Six parts. **(6 × 2 = 12)**

i. What are Okazaki fragments? Give their lengths.
ii. What is primitive streak? How is it formed?
iii. Define Transcriptic and Anticodon
iv. What is meant by Nucleosome and gene?
v. State Regeneration and dedifferentiation.
vi. Define Interphase. Name its subphases.
vii. Characterize pachytemce in Meiosis I.
viii. What are vestigial organs? Give examples as well.
ix. Define genetic drift and hydrothermal vents.

Section-II

Note: Attempt any three (3) questions: **(3 × 8 = 24)**

Q.5(a) How goes osmoregulation take place in terrestrial animals?
(b) What are different components of ecosystem?
Q.6 (a) Discuss sliding filament model of Muscle contraction.
(b) Describe the process of transcription.
Q.7 (a) Explain Feedback mechanism.
(b) Write a note on importance of forests.
Q.8 (a) Describe the types of parthenogenesis in animals
(b) What is dominance? Explain complete and incomplete dominance with example
Q.9 (a) Describe in your own words the Growth Correlations In plants.
(b) Describe evidence of evolution from the Comparative Anatomy of animals.

GUJRANWALA BOARD

Biology (New Scheme) **(Inter Part-II) (Group-I)** **Time : 20 Minutes**
Session: (2021) **Objective** **Marks : 17**

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- The average rainfall in temperate deciduous forest is between
(A) 600 —1500 mm (B) 650 — 1500 mm
(C) 750 — 1500 mm (D) 700 — 1500 mm

2- Recombinant DNA is introduced into the host cell by means of a
(A) Phage (B) vector (C) bacterium (D) fungus

3- For the formation of phragmoplast, the vesicles originate from
(A) endoplasmic reticulum (B) ribosome
(C) Golgi complex (D) chloroplast

4- Chromosomes appear inside the nucleus at the time of
(A) Cell elongation (B) cell maturation (C) cell differentiation (D) cell division

5- Primary growth in plants is caused by
(A) lateral meristem (B) intercalary meristem
(C) apical meristem (D) secondary meristem

6- Bundle caps in sunflower stem are formed by
(A) Parenchyma (B) sclerenchyma (C) mesenchyma (D) collenchyma

7- Plant hormones, which are indole acetic acid or its varients are
(A) auxins (B) gibberellins (C) ethane (D) abscisic acid

8- A plant adapted to remove the flooding of its cells in fresh water is
(A) Xerophyte (B) mesophyte (C) hydrophyte (D) geophyte

9- Which of the following is a renewable resource?
(A) Oil and air (B) water and oil (C) oil and gas (D) air and water

10- A group of bacteria that can tolerate temperature upto 120°C.
(A) Eubacteria (B) mycoplasma (C) E-Coli (D) archaeobacteria

11- Reproduction is necessary for the survival of
(A) Individual (B) species (C) community (D) biome

12- The basic functional unit of ecology is
(A) Ecosystem (B) population (C) niche (D) community

13- Which one is not a mesophyte?
(A) Cactus (B) mango (C) rose (D) brassica

14- Period of life cycle of cell between two consecutive divisions is termed as
(A) Resting phase (B) interphase (C) G1-phase (D) S-phase

15- Which bone does provide attachment site for muscle?
(A) Spongy bone (B) soft bone (C) cartilage (D) compact bone

16- Expression of a trait is termed as
(A) Phenotype (B) genotype (C) wild type (D) mutant type

17- Movement and rearrangement of the cells in the embryo is called
(A) Gastrulation (B) cleavage (C) fertilization (D) blastula

GUJRANWALA BOARD

Biology (New Scheme) (Inter Part-II) (Group-I) Time: 2:40 Hours

Session: (2021) Subjective Marks: 68

Note: Secotion I is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. What is lithotripsy?
ii. Define panting with one example.
iii. Define dialysis. Give its types.
iv. Distinguish between origin and insertion of muscles.
v. What is hematoma formation?
vi. What arc floating ribs?
vii. What is follicle atresia?
viii. Define parthenocarpy with examples.
ix. Give the name of major ecosystems in Pakistan,
x. Compare littoral zone with limnetic zone.
xi. What is acid rain?
xii. What are two main sources of water pollution?

Q.3: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. What are diurnal rhythms and circannual rhythms?
ii. Write down any two functions of ethene.
iii. What arc neurotransmitters? Give one example.
iv. Differentiate between genotype and phenotype.
v. What is over dominance?
vi. What are secretors?
vii. Write down a note on restriction endonuclease and give its one function.
viii. What is probe? Write down its role.
ix. Write down a note on Taq Polymerase.
x. What is niche?
xi. Write down biotic components.
xii. Write down a note on root nodules.

Q.4: Write short answers to any Six parts. **(6 × 2 = 12)**

i. Write down the role of auxins and cytokinins in apical dominance.
ii. How development is affected by ionizing radiations and nutritional deficiency?
iii. Define promoter region. Which binding sites are present in this region?
iv. Which is true DNA replicating enzyme in E.Coli? Also write its structural features.
v. How eukaryotic m RNA is modified? What is the significance of this modification?
vi. What is the cause of Klinefelter's syndrome? Write down the symptoms of this disease.
vii. Differentiate between Go and G1 phases of cell cycle.
viii. Define population and population's gene pool.
ix. What is endosymbiont hypothesis? Who proposed this hypothesis?

Section-II

Note: Attempt any three (3) questions: **(3 × 8 = 24)**

Q.5(a) Give a detailed account of nitrogen cycle.
(b) Define nephron. Discuss its structure and function in detail.

Q.6 (a) Write down a note on sclerenchyma culls and collenchyma cells.
(b) Explain Watson and Crick's model DNA.

Q.7 (a) Describe in detail the role of adrenal glands.
(b) Describe the causes and effects of acid rain.

Q.8 (a) Discuss the process of birth in human female.
(b) Explain codominance with the help of MN blood group system in man.

Q.9 (a) Define regeneration. Describe the mechanism of regeneration in planaria and salamander.
(b) Explain the evolution of eukaryotes by endosymbiotic hypothesis and membrane invagination hypothesis.

D.G.KHAN BOARD

Biology (New Scheme) **(Inter Part-II) (Group-I)** **Time : 20 Minutes**
Session: (2021) **Objective** **Marks : 17**

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- **The uptake of sodium in the thick loop of Henle is promoted by the action of**
(A) ADH (B) Aldosterone (C) Oxytocin (D) Testosterone

2- **Which emulsifies fats in small intestine?**
(A) Bile (B) Glycogen (C) Cholesterol (D) Lipoprotein

3- **Angular thickenings in the primary walls are present in**
(A) Parenchyma cells (B) Sclerenchyma cells (C) Collenchyma cells (D) Trachieds

4- **Complete immobilization of muscle leads to muscle weakness and severe**
(A) Atrophy (B) Cramp (C) Tetany (D) Trauma

5- **Hormone that suppresses ovulation is**
(A) Testosterone (B) Oestrogen (C) Progesterone (D) Gastrin

6- **The yellowish glandular structure corpus luteum, starts secreting a hormone**
(A) LH (B) FSH (C) Oestrogen (D) Progesterone

7- **Which represents the dorsal and both lateral lips of blastopore?**
(A) Primitive streak (B) Henson's Node (C) Coelom (D) Neurocoel

8- **Healing of fracture and repair of the skin are examples of**
(A) Reproduction (B) Mutation (C) Regeneration (D) Induction

9- **Miescher extracted a white substance from the nuclei of human cells and fish sperm called**
(A) Nuclein (B) Penicillin (C) Mucin (D) Adenine

10- **Each bivalent has chromatids wrap around each other**
(A) 02 (B) 04 (C) 06 (D) 08

11- **In diplotene, homologous chromosomes remain united by their point of interchange called**
(A) Bivalent (B) Centromere (C) Synapse (D) Chiasmata

12- **ABO blood group system was discovered by**
(A) Bernstein (B) Punett (C) Karl Landsteiner (D) Wiener

13- **Organisms that have a foreign gene inserted into them are called**
(A) Genome (B) Transgenic (C) Bioreactor (D) Nutrasweets

14- **Armadillos armored mammals live only in**
(A) Africa (B) Asia (C) America (D) Australia

15- **The food relationship predator-prey creates a**
(A) Chain (B) Cycle (C) Stage (D) Circle

16- **Phytoplankton includes cyanobacteria which serve as**
(A) Decomposers (B) Feeders (C) Crustaceans (D) Producers

17- **The driving force behind all of natural cycles is**
(A) Sun (B) Air (C) Water (D) Soil

D.G.KHAN BOARD

Biology (New Scheme) **(Inter Part-II) (Group-I)** **Time: 2:40 Hours**
Session: (2021) **Subjective** **Marks: 68**

Note: Secotion I is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. Define lithotripsy
ii. What are poikilotherms? Give one example.
iii. What is homeostasis?
iv. Differentiate between tendon and ligament.
v. Briefly write hematoma formation
vi. Give composition of filaments of skeletal muscle.
vii. How sperms travel from testes to outside?
viii. Define ovulation and menopause
ix. What are Prairies and Savanna?
x. Briefly describe the conditions of Taiga
xi. What are the effects of ozone layer?
xii. Define eutrophication. What are its effects?

Q.3: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. What are Neurotransmitters? Give their examples
ii. Define Gibberellins. Give their two commercial applications.
iii. Define Epilepsy. Give its treatment
iv. Define multiple alleles. Give an example
v. Differentiate between homozygous and heterozygous
vi. Give any two adverse effects of maternal foetal Rh-incompatibility.
vii. What is Recombinant DNA?
viii. Define palindromic sequences. Give one example
ix. Compare molecular scissors and vectors
x. Define the term commensalism by giving an example
xi. Differentiate between Ammonification and Nitrification
xii. What is parasitism?

Q.4: Write short answers to any Six parts. **(6 × 2 = 12)**

i. Define growth correlations.
ii. Differentiate between inhibitory effects and compensatory effects in apical dominance.
iii. Differentiate between purines and pyrimidines bases
iv. Name any four important enzymes involved in DNA Replication
v. What is semiconservative replication of DNA?
vi. Why interphase is called resting phase?
vii. Compare cytokinesis in animal cell with cytokinesis in plant cell
viii. What is endosymbiont hypothesis?
ix. What do you mean by descent with modification?

Section-II

Note: Attempt any three (3) questions: **(3 × 8 = 24)**

Q.5 (a) Give major homeostatic functions of liver.
(b) What is nitrogen cycle? Discuss various steps of nitrogen cycle.
Q.6 (a) Write sliding filament model of muscle contraction in detail
(b) Write in detail Watson and Crick's model of DNA
Q.7 (a) Define Synapse. How nerve impulse passes from one neuron to another.
(b) Write note on deforestation and afforestation
Q.8 (a) Discuss female reproductive eyelets in Human female.
(b) Explain Diabetes mellitus and its genetic basis.
Q.9 (a) Write a note on neurulation in chick development.
(b) How is comparative embryology the evidence of evolution?

MULTAN BOARD

Biology (New Scheme) (Inter Part-II) (Group-I) Time : 20 Minutes
Session: (2021) Objective Marks : 17

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- **In Microcephaly, the individuals are born with small:**
(A) Skull (B) Neck (C) Jaws (D) Vertebrae

2- **Crossing over is occurred in:**
(A) Zygotene (B) Pachytene (C) Leptotene (D) Diplotene

3- **Down's syndrome has number of chromosomes:**
(A) 47 (B) 45 (C) 46 (D) 44

4- **The receptors which produce the sensation of pain are called:**
(A) Chemo receptors (B) Photo receptors (C) Nociceptors (D) Thermo receptors

5- **Parthenocarpy is artificially induced by adding:**
(A) Auxins (B) Ethene (C) Abscisic acid (D) Gibberllins

6- **Highly condensed portions of chromatin are called:**
(A) Euchromatin (B) Chromatids (C) Centromere (D) Heterochromatin

7- **Position of gene on chromosome is called:**
(A) Allele (B) Genotype (C) Locus (D) Phenotype

8- **The enzyme which is used to cut out the gene of interest, is called:**
(A) DNA Ligase (B) Restriction Endonucleases
(C) NA Polymerase (D) DNA Polymerase

9- **Archaeobacteria can tolerate temperature upto:**
(A) 120°C (B) 122°C (C) 125°C (D) 115°C

10- **The actual location of place, where an organism lives is called its:**
(A) Niche (B) Environment (C) Biome (D) Habitat

11- **In aquatic ecosystem near shore zone is called:**
(A) Limnetic zone (B) Profundal zone (C) Littoral zone (D) Benthic zone

12- **A treasure of all types of resources essential to maintain life on earth is:**
(A) Environment (B) Water (C) Land (D) Sun

13- **The excretory product that requires minimum water for its elimination as compared to others is:**
(A) Uric acid (B) Urea (C) Ammonia (D) Creatinine

14- **which of the following is called as Excretophore?**
(A) Stem (B) Root (C) Leaf (D) Seed

15- **Which of the following cells lack of secondary walls?**
(A) Sclerenchyma (B) Collenchyma (C) Mesophyll (D) Vessels

16- **Vertebrae of neck region are called:**
(A) Lumber (B) Thoracic (C) Cervical (D) Pelvic

17- **The meristems that are found at the tips of roots and shoots are called:**
(A) Lateral meristems (B) Intercalary meristems
(C) Secondary meristems (D) Apical meristems

MULTAN BOARD

Biology (New Scheme) **(Inter Part-II) (Group-I)** **Time: 2:40 Hours**
Session: (2021) **Subjective** **Marks: 68**

Note: Secotion I Is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. Compare hypotonic and hypertonic solution.
ii. How arthropods and mammals overcome the problem of evaporative water loss?
iii. Write the formula of uric acid.
iv. What is the role of vacuole in generating turgor pressure in plant cells?
v. What are cartilaginous joints?
vi. How does shape of wing effect the type of flight in birds?
vii. What is climactric?
viii. Define apomixis.
ix. What is profundal zone?
x. Compare prairies and savanna.
xi. Define pollution. Write any two types of pollution.
xii. What are the harmful effects of lead compounds and carbon monoxide?

Q.3: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. What are neuroglia?
ii. Define nerve impulse.
iii. Enlist hormones secreted by posterior lobe of pituitary gland.
iv. What are jumping genes?
v. Define probability. What is product rule?
vi. Define over dominance.
vii. What is recombinant DNA?
viii. What are plasmids? Give example.
ix. Write role of DNA Ligase.
x. Differentiate between population and community.
xi. Define ecological niche.
xii. Name six major terrestrial Biomes.

Q.4: Write short answers to any Six parts. **(6 × 2 = 12)**

i. Differentiate between growth and development.
ii. Compare epiblast and hypoblast in gastrulation stage of chick development.
iii. What is the function of RNA polymerase in Transcription?
iv. What is Nucleosome?
v. What is "One gene one polypeptide" Hypothesis?
vi. Define cell cycle.
vii. Give the significance of Meiosis.
viii. State Endosymbiont Hypothesis.
ix. What are fossils? Where are they found?

Section-II

Note: Attempt any three (3) questions: **(3 × 8 = 24)**

Q.5(a) Write a note on kidney problems and its cures.
(b) What arc acid rains? Write its effects.
Q.6 (a) Describe different phases of repair process of simple fracture.
(b) Describe the process of transcription.
Q.7 (a) Discuss in detail the hormones produced by anterior pituitary.
(b) Write notes on the following: (i) Eutrophication (ii) Greenhouse effect
Q.8 (a) Write a note on fruit set and fruit ripening.
(b) What are multiple alleles? Explain with an example.
Q.9 (a) Describe the process of Neurulation in chick development.
(b) Discuss factors affecting gene frequency of population.

FAISLABAD BOARD

Biology (New Scheme) **(Inter Part-II) (Group-I)** **Time : 20 Minutes**
Session: (2021) **Objective** **Marks : 17**

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- Removal of salts with water from sweat glands and of sebum seems to be:
(A) Excretory (B) Protective (C) Thermo-regulation (D) Both B & C

2- Kidneys receive what amount of blood supplied with each cardiac beat:
(A) 10 % (B) 20 % (C) 1 % (D) 25

3- Long tubular structures join end to end to form long water conducting pipes in xylem are known as:
(A) Fibers (B) Vessels (C) Sclereids (D) Trachea

4- Tropomyosin is a complex of how many polypeptide chains?
(A) Single (B) Double (C) Triple (D) None

5- The receptors which have undifferentiated endings and produce sensation of pain are called:
(A) Chemo-receptors (B) Nociceptors (C) Mechano-receptors (D) Thermo-receptors

6- Which is a haploid cell?
(A) Spermatogonia (B) Primary spermatocyte
(C) Secondary spermatocyte (D) Germinal epithelium

7- The final size of a given type of a cell is attained during:
(A) Maturation (B) Differentiation (C) Growth (D) Elongation

8- The peripheral part of the blastoderm where the cells lie unseparated from the yolk is called:
(A) Hypoblast (B) Epiblast (C) Area pellucida (D) Area opaca

9- DNA polymerase enzyme which plays a supporting role in DNA replication is:
(A) Polymerase II (B) Polymerase I (C) Polymerase III (D) Polymerase IV

10- The S-phase of cell cycle takes:
(A) 9 hours (B) 4.5 hours (C) 1.30 hours (D) 10 hours

11- Pairing of homologous chromosomes called synapsis starts during:
(A) Leptotene (B) Zygotene (C) Pachytene (D) Diakinesis

12- A person having neither antigen A nor B would have blood group:
(A) O (B) A (C) B (D) AB

13- Organisms that have a foreign gene inserted into them are called:
(A) Transduct (B) Transform
(C) Transgenic organism (D) Bioreactors

14- Archaebacteria tolerate temperature up to:
(A) 10°C (B) 40°C (C) 120°C (D) 140°C

15- Lithosphere includes:
(A) Air (B) Water (C) Gases (D) Earth, soil

16- In grassland ecosystem, tropical climates have woody trees called:
(A) Savanna (B) Pampas (C) Prairies (D) Alpine

17- The cause of acid rain is:
(A) Oxides of hydrogen (B) NO_2 and SO_2
(C) Oxides of potassium (D) Oxides of magnesium

FAISLABAD BOARD

Biology (New Scheme) **(Inter Part-II) (Group-I)** **Time: 2:40 Hours**
Session: (2021) **Subjective** **Marks: 68**

Note: Secotion I is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. Define anhydrobiosis with an example.
ii. What is glomerular filtrate?
iii. What is pyrexia?
iv. What is a ligament?
v. Differentiate between hyaline cartilage and elastic earn cartilage.
vi. How many ribs do not attach with the sternum?
vii. What is after birth?
viii. Define climacteric.
ix. What is the productivity of grassland ecosystem?
x. What are zooplankton? Give example.
xi. Define eutrophication.
xii. Give importance of forests.

Q.3: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. Compare nerve impulse with saltatory impulse.
ii. What is cerebrospinal fluid? Give its function.
iii. What is acetylcholine? Give its role.
iv. Differentiate between alleles and multiple alleles.
v. What is universal blood donner?
vi. What are opsins?
vii. Give difference between ex-vivo and in-vivo gene therapy.
viii. How hypercholesterolemia can be cured by gene therapy?
ix. How cancer patients are being treated by gene therapy?
x. Define biosphere.
xi. Differentiate between habitat and ecological niche.
xii. Define food chain. Give example.

Q.4: Write short answers to any Six parts. **(6 × 2 = 12)**

i. Compare morula and blastula.
ii. How does coelom develop in chick embryo?
iii. Compare heterochromatin and euchromatin.
iv. Define transformation.
v. Differentiate between template and coding strand of DNA.
vi. Calculate the length of human cell cycle.
vii. Compare kinetochore microtubules and polar microtubules.
viii. How does molecular biology provide an evidence for evolution? Give at least one example.
ix. Can migration affect the genotype frequency? If yes, how?

Section-II

Note: Attempt any three (3) questions: **(3 × 8 = 24)**

Q.5(a) How osmoregulation occurs in fresh water and terrestrial environment?
(b) Describe symbiosis and mutualism.

Q.6 (a) Write the process of ecdysis in arthropods.
(b) Explain process of translation.

Q.7 (a) What are receptors? Write names and functions of any four receptors
(b) What is greenhouse effect?

Q.8 (a) Give an account of sexually transmitted diseases in man.
(b) Write note on mother-foetal Rh incompatibility.

Q.9 (a) Discuss the Notochord and Mesoderm formation in chick embryo.
(b) Describe the evidences of evolution from comparative anatomy.

SARGODHA BOARD

Biology (New Scheme) (Inter Part-II) (Group-I) Time : 20 Minutes

Session: (2021) Objective Marks : 17

Note: Four possible choice A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

Q.1: MCQ's

1- Skeletal muscles are also called striped or striated muscles because they show:

(A) Red & Yellow bands (B) White & Yellow bands
(C) Alternating dark & light bands (D) Red & black bands

2- In microcephaly, the individuals are born with small:

(A) Eyes (B) Legs (C) Hands (D) Skulls

3- The sex chromosomes of the person affected with Klinefelter's syndrome are:

(A) XYY (B) XXY (C) XXX (D) XY

4- The most concentrated external environment is termed as:

(A) Isotonic (B) Hypertonic (C) Peritonic (D) Hypotonic

5- The turgor pressure is generated by osmotic pressure of the:

(A) Cell vacuole (B) Cell cytosole (C) Cytoplast (D) Protoplast

6- Promote bolting or some rosette plants:

(A) Abscisic acid (B) Cytokinins (C) Gibberellins (D) Ethene

7- Parthenocarpy is the development of fruit without:

(A) Pollination (B) Germination (C) Vegetation (D) Fertilization

8- In the zone of elongation, the volume of cells increase upto:

(A) 100 times (B) 150 times (C) 200 times (D) 250 times

9- Walther Fleming first observed chromosomes in the dividing cells of:

(A) Frog larvae (B) Sea-Urchin larvae (C) Insect larvae (D) Salamander larve

10- During cell division, the nuclear division is called:

(A) Karyokinesis (B) Cytokinesis (C) Plasmolysis (D) Diakinesis

11- Locus is a:

(A) Part of DNA (B) Position of Gene
(C) Partner of Gene (D) Compartment of Gene

12- Recombinant DNA is introduced in to the host cell by means of:

(A) Vector (B) Parasite (C) Bacteria (D) Fungus

13- Archeobacteria tolerate temperature upto:

(A) 10°C (B) 40°C (C) 120°C (D) 140°C

14- Lithosphere includes:

(A) Air (B) Water (C) Gases (D) Earth soil

15- In grassland ecosystem, tropical climates have woody trees called:

(A) Savanna (B) Pampas (C) Prairles (D) Alpine

16- The total area of the World under cultivation is:

(A) 9% (B) 10% (C) 11% (D) 12%

17- Lizards bask in the sun to gain:

(A) Heat (B) Cold (C) Air (D) Moisture

SARGODHA BOARD

Biology (New Scheme) (Inter Part-II) (Group-I)
Session: (2021) Subjective Time: 2:40 Hours
Marks: 68

Note: Secotion I is compulsory, Attempt any 3 questions from Section II.

Section-I

Q.2: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. Differentiate between osmoconformers and osmoregulators.
ii. Define anhydrobiosis with an example.
iii. What arc heat shock proteins?
iv. Write any two functions of skeleton.
v. Compare photonasty and thennonasty.
vi. Define eedysis and ecdysone.
vii. Write a note on pollen tube.
viii. What are identical twins?
ix. What is the impact of human activities on temperate deciduous forests?
x. What kind of soil conditions are found in grassland ecosystem?
xi. Differentiate between renewable and non-renewable environmental resources,
xii. Define deforestation and afforestation.

Q.3: Write short answers to any Eight parts. **(8 × 2 = 16)**

i. What are auxins? Give their at least two commercial applications.
ii. Differentiate Reflex action from Reflex Arc.
iii. Define the term synapse?
iv. Define Restriction Enzymes. Give at least one example.
v. What is PCR? Give its at least two uses.
vi. What is Gene Pharming?
vii. What is Gene Pool?
viii. Compare incomplete dominance and codominance.
ix. What is Erythroblastosis Foetalis?
x. Compare population and community by giving examples.
xi. What is predation? Give its significance.
xii. Define the term Mutualism by giving an example.

Q.4: Write short answers to any Six parts. **(6 × 2 = 12)**

i. What are lateral meristems?
ii. What is discoidal cleavage?
iii. How phosphodiester bond is formed?
iv. Give the structure of a typical nucleotide.
v. What do you know about Okazaki fragments?
vi. Define metastasis.
vii. Define mitosis.
viii. What are vestigial organs?
ix. Name any four factors affecting gene frequency of a population.

Section-II

Note: Attempt any three (3) questions: **(3 × 8 = 24)**

Q.5(a) Write a detail note on dialysis.
(b) Discuss food web in detail.
Q.6 (a) Explain the repaire of Broken bones.
(b) Write the process of transcription.
Q.7 (a) Describe the structure and function of fore brain of human.
(b) Describe causes and effects of greenhouse house and acid rain.
Q.8 (a) What are Multiple alleles? Explain with the help of ARO blood groups.
(b) Give an account or Male reproductive system in man.
Q.9 (a) What is gastrulation in the development of chick.
(b) How is the fossil record an evidence of evolution.

Answers (Sahiwal Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
C	A	D	A	B	A	B	D	C	B	C	B	B	A	C	B	C

Answers (Bahawalpur Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
C	A	C	D	D	C	C	A	B	A	C	B	A	C	D	B	D

Answers (Rawalpindi Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A	C	A	C	B	C	D	B	A	B	C	C	D	C	C	B	A

Answers (Gujranwala Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
C	B	C	D	C	B	A	C	D	D	B	A	B	B	D	A	A

Answers (D.G Khan Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
B	A	C	A	C	D	A	C	A	B	D	C	B	C	A	D	A

Answers (Multan Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A	B	A	C	A	D	C	B	A	D	C	A	A	C	B	C	D

Answers (Faisalabad Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A	B	B	C	B	C	A	D	B	D	B	A	C	C	D	A	B

Answers (Sargodha Board)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
C	D	B	B	A	C	D	B	D	A	B	A	C	D	A	C	A

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